JULY 8, 1996 VOLUME 13, NUMBER 28

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

HP TACKLES SNA

Revised gateway to rival IBM, Microsoft offerings. Page 5.

EMERGING STANDARDS

'Smart' agents will cooperate across networks

By Joanie Wexler

A budding standard could soon make intelligent agents a more powerful and prevalent tool for sifting through scads of information on corporate networks or out on the 'Net.

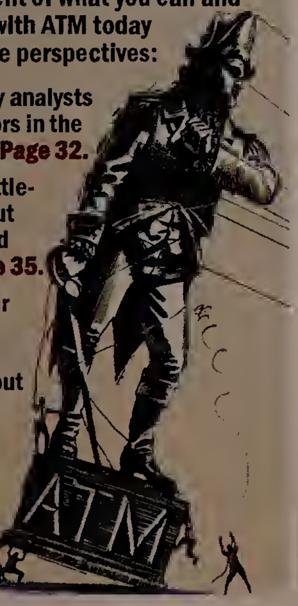
The Internet Engineering Task Force (IETF) and the World-Wide Web Consortium are looking to standardize the way different vendors' agents communicate, tackling the problem with a new specification called the Simple Agent Transfer Protocol (SATP).

The emergence of a standard would enable developers to build agent-based client and server applications that could

See Agents, *page 11*

Special section

ATM: FROM LAN TO WAN



Enough hype. Here's an honest assessment of what you can and can't do with ATM today from three perspectives:

- **Industry analysts and vendors in the trenches. Page 32.**
- **One battle-scarred but undaunted user. Page 35.**
- **The Mier test lab, which checked out Ethernet-to-ATM switches. Page 37.**

Multivendor calendaring coming to your intranet

By Barb Cole and Carol Sliwa

Lotus Development Corp. wants to be the driving force behind a standard that would let disparate calendaring systems work together over the Internet and corporate intranets. But the company may get competition from some powerful messaging and groupware rivals.

Hewlett-Packard Co. and Netscape Communications Corp. are reported to be among the other companies discussing interoperability of calendaring products. These discussions follow Lotus' announcement a few weeks ago that it plans to lead development of what it called the Internet Calendaring Access Protocol (ICAP), a Web-based standard for sharing calendaring information.

"Lotus is talking about [developing the standard], and

See Calendaring, *page 12*

Get more info online, including:

- **A look at the failed XAPIA calendaring API**
- **Articles on groupware incompatibility**

Select News+ then Front Page.

NetworkWorld Fusion

http://www.nwfusion.com

Here come PC server clusters, but where are all the apps?

By Ben Heskett and Chris Nerney

By this time next year, Windows NT customers will be able to set up server clusters using computers from their vendor of choice.

But will any applications be able to tap into the power that Pentium-based server clusters deliver?

Most applications can run untouched in a basic failover cluster in which one server backs up another. However, analysts said applications for full-blown clusters will probably lag. At this point, companies developing cluster-aware operating systems and middleware have only a handful of commitments from applications vendors.

"Software for clusters is very complex," said Michael Goulde, a senior consultant with Boston-based Patricia Seybold Group, Inc. "Clustering hardware is easy compared to [clustering] software."

See Clusters, *page 52*

Cabletron gears up for gigabit Ethernet

By Jodi Cohen

Rochester, N.H.

Call it "Fast Times at Hub High."

Cabletron Systems, Inc. is pushing the concept of ultrahigh-speed Ethernet to reality with the development of its first gigabit Ethernet device — a module for its flagship switching hub that will tie other backbone and downstream switches together over high-speed links.

Cabletron's *Oliver says gigabit Ethernet is a viable alternative to ATM cell switching.*

What's more, the company revealed during a briefing with *Network World* that it will boost the performance of its backbone switch by some 500% and cut the price of its Ethernet/Fast Ethernet switches in half — in part to drive demand for gigabit Ethernet offerings.

Expected to be unveiled at this fall's NetWorld+Interop '96 trade show in Atlanta, the gigabit Ethernet module will take Cabletron's fast LAN strategy to a level beyond the company's existing Fast Ethernet, FDDI and Asynchronous Transfer Mode offerings.

Gigabit Ethernet gives customers a high-speed LAN back-

See Cabletron, *page 52*

LOOK BEFORE YOU LEAP INTO CLUSTERING

Jon Oltsik, a server analyst with the Aberdeen Group, Inc. consultancy, says that when making the move to PC server clustering, you should "go in with your head up because [clustering] is more expensive and more management-intensive than most people anticipate. You really need to ask yourself: What's your long-term goal? Is it to do some failover capability, or is it eventually to do some parallelism? You need to understand what the direction of the clustering vendor is, as well."

Oltsik's pointers:

- **Choose clustering software that will be compatible with Windows NT's Wolfpack clustering extensions and run on systems with different speed processors.**
- **Make sure management capabilities are included in any clustering package.**
- **Go with a standard interconnect technology, such as Ethernet or FDDI, for failover clustering. For distributed parallel clustering, higher speed interconnects such as Memory Channel will be necessary.**
- **Make sure disks can be shared by clustered servers.**

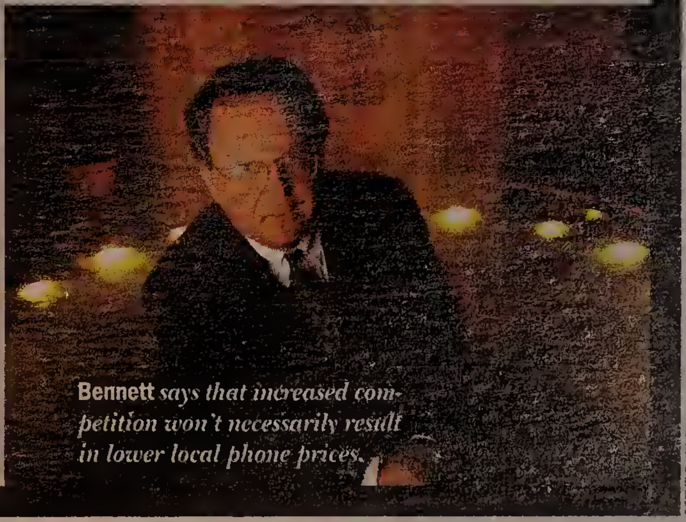
AT&T plots invasion of Baby Bell turf

Q&A

Harry Bennett, vice president and general manager of AT&T's local services division, is leading the company's charge into battle for the local loop, a hugely ambitious undertaking that spans the country and may forever change the character of the $51 billion company. *Network World* Editor John Dix and Senior Washington Correspondent David Rohde recently discussed AT&T's strategy with Bennett at the company's headquarters in Basking Ridge, N.J.

See Bennett, *page 53*

AT&T and Ameritech reach resale agreement. Page 6.



Bennett *says that increased competition won't necessarily result in lower local phone prices.*

STEVE BURNS

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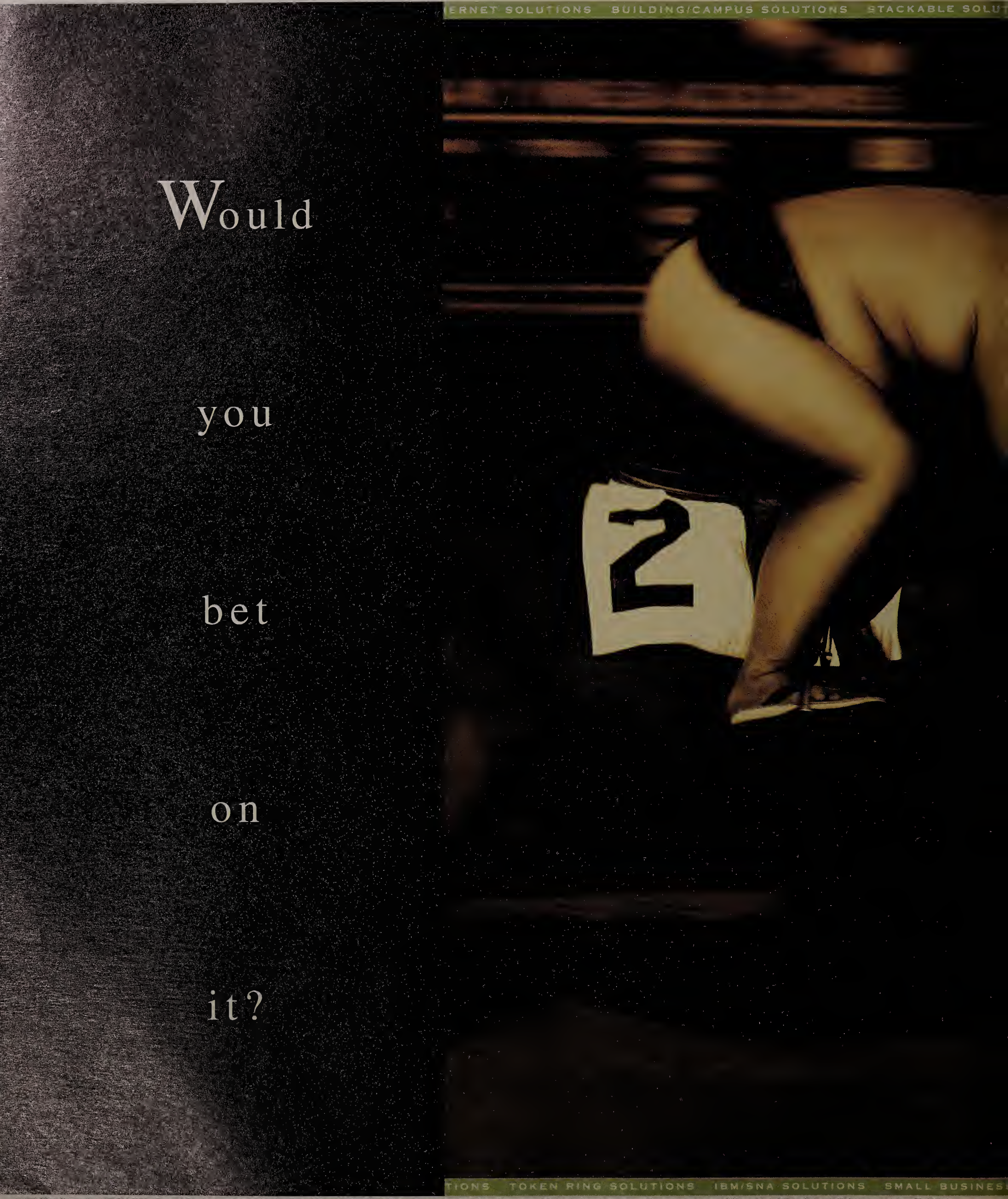

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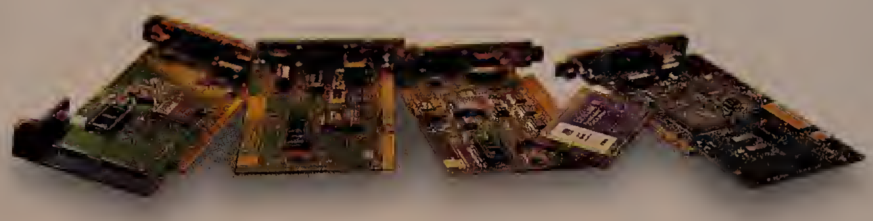

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This Week

News+

The Front Page:

- **Agents:** Not everybody thinks intelligent agents should be unleashed on the Internet. Read why Jaron Lanier, one of the fathers of virtual reality, thinks they are evil.
- **Gigabit Ethernet:** See who's planning what for this emerging technology in a series of *Network World* articles.
- **Local loop:** Read articles on AT&T's efforts to get back into the local telephone market.

The Technical Sections:

- **IP switching:** Download primers, white papers and articles that explain this new technology, in WANs & Internetworking.
- **Web applications:** Grab white papers and follow links related to scripting languages that let you link Web users to back-end applications, in Intranets & the 'Net.
- **Groupware:** Read up on different vendors' approaches to groupware and download articles that can help you develop a client/server messaging strategy, in Client/Server Applications.

NetRef

Download detailed charts comparing ATM switches reviewed this week (page 37). Select NetRef, Buyer's Guides and Reviews, then ATM Switches.

this week's pick

"Suitability of the Internet for Electric Power Transmission Realtime Information Networks" sounds like a dry technical treatise, but it provides a good introduction to the workings of the Internet and the issues of reliability and security on such a public network. Grab a copy at http://www-itg.lbl.gov/~johnston/EDM/Internet.and.RINs.fm.htm

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NetworkWorld Fusion

CONFERENCE PICK

Hot Topic James Kobielus has strong views on wireless Web access. Read his opinion on page 30, then voice your own.

Select Forum, Columnists then Above the Cloud.

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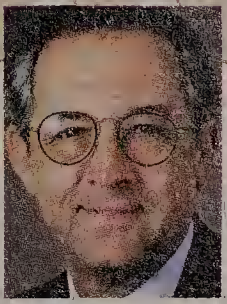

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Argonne is all for ATM:

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NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

News briefs, July 8, 1996

Rough week for high tech

There was no shortage of bad news in the computer and network industry last week. Financials were off, heads rolled and layoffs were announced. Here's a roundup:

■ For the second time in a matter of weeks, Compaq Computer Corp. lost a high-ranking executive. The company said Gary Stimac, executive vice president and general manager of Compaq's systems division, resigned for personal reasons amid a corporate reorganization. Compaq reorganized into three umbrella groups based on different market segments: an Enterprise Computing Group, a PC Products Group and a Consumer Products Group. Stimac's resignation follows the departure of Gene Austin, former vice president of marketing.

Compaq's *Stimac*

■ Database vendor Sybase, Inc. said it expects to lose $20 million in its fiscal second quarter ended June 30. Oracle Corp., Informix Software, Inc. and Microsoft Corp. have all been cutting into Sybase's business. The company said it will lay off as many as 700 people in coming weeks and plans to rid itself of peripheral product lines to save money and improve its focus.

■ Digital Equipment Corp. said it will take a $475 million restructuring charge against fourth-quarter earnings and lay off about 7,000 employees over the next 12 months. Robert Palmer, Digital's chief executive officer, attributed the company's problems largely to poor performance by its personal computer group. In a related move, Enrico Pesatori, president and general manager of the computer systems division, also resigned.

■ Borland International, Inc. announced the resignation of CEO Gary Wetsel and predicted a big loss for its fiscal first quarter ended June 30. Underwhelming sales of its Delphi applications development tool are partly to blame for the poor performance, the company said.

■ Tandem Computers, Inc. announced it has asked Lehman Brothers Holdings, Inc. of New York to "explore strategic alternatives" for its UB Networks, Inc. subsidiary. This is not Tandem's first attempt to sell off the struggling hub vendor; in a corporate financial report three years ago, the company revealed similar plans to cut the company loose.

Making StreetTalk a standard

■ Banyan Systems, Inc.'s StreetTalk will become the directory standard for intranets if the company's Internet division, Coordinate.com, and partner Software.com, Inc., have their way. The companies last week announced the signing of a multiyear joint development and licensing agreement that calls for Software.com to integrate the StreetTalk directory technology into its Post.Office Internet messaging server and InterMail Internet message store server. Both companies also agreed to resell each other's products. In addition, Banyan plans to make a minority equity investment in Software.com.

A name that Frankenberg will love

■ Database vendor Btrieve Technologies, Inc. last week announced it has a new name: Pervasive Software, Inc. The company said the new name "reflects the company's expanding role as the leading supplier of database technology designed to bring client/server computing to the mass market." We thought that perhaps Robert Frankenberg, chief executive officer of Novell, Inc., had picked out the name. After all, "pervasive computing" was the theme of most of his speeches last year. Novell and Btrieve have also played volleyball with the Btrieve database technology in recent years.

PERVASIVE SOFTWARE
Formerly Btrieve Technologies

Hancock turns up

■ Apple Computer, Inc. last week announced it has named Ellen Hancock — IBM's former networking chief — executive vice president of research and development and chief technology officer. She will report to Gilbert Amelio, Apple's chairman and chief executive officer, starting today.

Illinois opens door to the local loop

New 22% wholesale discount rate will encourage AT&T, others to compete for local service.

By Tim Greene

Springfield, Ill.

Illinois has lifted a major barrier to AT&T entering the local telephone market here, setting a wholesale rate for local service that knocks about 22% off the retail rate.

TELECOM IN TRANSITION

With that decision and the resolution of other regulatory issues expected to be sorted out over the next several months, AT&T said it hopes to be able to offer packaged local and long-distance service throughout Illinois by the end of the year.

Although AT&T has grand plans to enter local markets across the country (see story, page 1), the only other place AT&T has specific local plans is Georgia, where a limited trial is scheduled to start Sept. 1.

The Illinois Commerce Commission's June 26 order affects Ameritech Corp.'s wholesale rates generally, not just those charged to AT&T. It also affects wholesale rates set by Central Telephone Co., another local exchange carrier (LEC) in Illinois.

But AT&T brought the complaint that resulted in the ruling, and it has said that adequate wholesale discounts are critical to its entry into local markets. Although AT&T eventually intends to offer facilities-based local services, it initially will simply resell services procured from LECs at wholesale prices.

Discount compromise

AT&T had wanted a 25% to 50% discount off retail rates, but said 22% would be enough. Ameritech proposed 8%. In Rochester, N.Y., AT&T decided earlier this year that the Rochester Telephone Co.'s 5% discount was too small for AT&T to resell at a profit.

The 22% discount is an estimated average for all the Ameritech services AT&T may resell. Individual services may wholesale at higher or lower rates.

There are a number of other issues that have to be settled before AT&T and other carriers can reach full interconnection agreements with Ameritech, and those are being mediated by the commission.

These issues include how users can keep their old phone numbers when they change local carriers, how competing carriers will pay when another carrier completes a local call, and whether Ameritech operators will announce themselves as working for other carriers when calls come in from those carriers' customers.

In addition to defining wholesale rates, the commission cleared the way for other types of local competitors, based on the petition of LDDS WorldCom, Inc. It has ordered Ameritech to sell discrete, unbundled elements of its network to competitors that want to design their own local services rather than resell Ameritech's.

Those elements are the local loop, switching and local-call termination.

However, the commission set no rules for how those elements will be priced. ■

HERE'S THE DEAL

How Ameritech must figure wholesale rates for local phone service:

Retail rates

– Avoided costs (marketing, billing, etc.)

Average discount of about 22%

LCI to LECs: Why the silent treatment?

The tension among local exchange and long-distance carriers got even heavier last week when long-haul carrier LCI International terminated local service negotiations with all the LECs.

LCI told the RBOCs and three independent LECs it was withdrawing from formal negotiations because of a lack of cooperation on the LECs' part. Such bumps in the new telecommunications landscape promise to postpone users' ability to take advantage of new services and lower prices that may results from local competition, observers said.

According to LCI, none of the LECs have supplied it with sufficient information on pricing structures or technical interface specifications, which it requested in early March. And the carriers are nearing the end of the negotiation period, after which they are allowed to seek arbitration by state public utility commissions on unresolved issues. Arbitration may be sought 135 to 160 days after the initial request for information is made, according to the Telecommunications Act of 1996.

But without the LEC information, "we don't know what we need to resolve," said Roy Gamse, LCI's vice president of marketing, who oversees the company's local access business. If the 160-day limit comes and goes, he said, "we're stuck. A LEC can offer us terms and say 'take it or leave it.' "

At least two RBOCs were surprised by the LCI move. A NYNEX Corp. spokeswoman said the local carrier has met with LCI and been willing to "do anything they need to reach an agreement quickly." She would not disclose particulars about LCI talks, such as whether NYNEX had proposed pricing terms. But she said NYNEX is negotiating with 20 carriers and is nearing final agreements with some.

In addition, Ameritech Corp. said it provided everything LCI had requested, including pricing information.

—Joanie Wexler

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Bandwidth is tight. ATM sounds nice. But it also sounds pretty darn expensive.

Switch IBM presents the first affordable 25Mbps ATM Workgroup Solution. Everyone is talking about ATM as the answer for speeding up busy networks. But there are two good reasons why business hasn't stampeded en masse to the ATM solution: It costs a lot. And to get there, you have to rip out everything you have.

Well, with all respect to the status quo, IBM now unveils the new 25Mbps ATM Workgroup Solution. It comes complete with workstation adapters, giving you an immediate boost in bandwidth, with plenty of room to grow in the future. And it all comes at the refreshingly low price of $495 per connection.

So why just dream about getting an affordable ATM solution when you can install one today? See your nearest IBM reseller or call us at 1 800 IBM-2468, ext. DA130, to learn more. Or, if you prefer, you can visit our Web site at www.raleigh.ibm.com/netad.html for all of the details. We have lots of information to share. And the good news is, we can get it to you fast.

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Security toolbox to meet your every need

By Tim Greene

Minneapolis

Network Systems Corp. wants to meet your every network security need with a program that combines products and risk auditing and management services — even lawyers to go after the perpetrators when your network has been hacked.

NSC contributes its secure routers, as well as its own security evaluation and encryption hardware and software to the program. NSC also has partnered with The Guidry Group and WheelGroup Corp. to provide physical security checks and electronic network monitoring, respectively.

Adding a new dimension to security, NSC will line users up with the Minneapolis-based law firm of Oppenheimer, Wolff and Donnelly to help them determine whether to fight hackers in court.

The companies have been quietly working on their cooperative service, called Net'Vestigator, for months, and just landed their first customer three weeks ago.

Val Sribar, a service director for META Group, Inc., said the offering was unique in scope, and their level of expertise was also a cut above other offerings, he said.

Sribar said many companies marketing security hardware also offer security consulting services. "But they're at a pretty basic level. They're not as sophisticated," he added.

The law firm will evaluate corporate security policies to protect a company from liability based on internal attacks, which represent 80% of all network intrusions, according to Peter Adler, an attorney with Oppenheimer, Wolff and Donnelly.

If there is a security breach and the guilty party is found, the law firm can help decide whether to file criminal charges, file civil lawsuits or do nothing at all to avoid word getting out that the client's network has been cracked.

The Guidry Group checks, among other things, for physical access vulnerabilities, such as who has access to terminals.

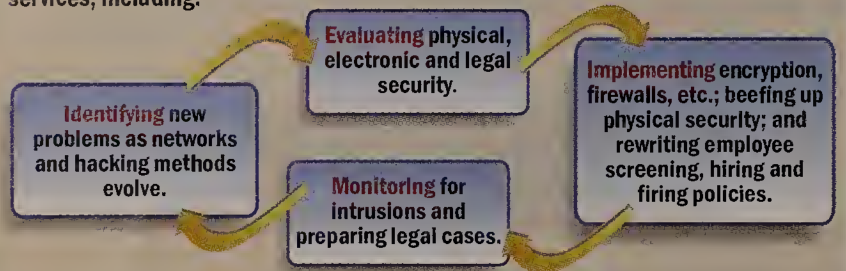
WheelGroup assesses the electronic security of the private network, checking things such as firewalls and authentication procedures, and can monitor the network 24 hours a day looking for trespassers.

The firm has a network security operations center for monitoring nets using its NetRanger

See **NSC**, *page 52*

Making your network safe

Network Systems, The Guidry Group, WheelGroup and Oppenheimer, Wolff and Donnelly have partnered to plug network security gaps. They offer a life cycle of services, including:


Evaluating physical, electronic and legal security.
Implementing encryption, firewalls, etc.; beefing up physical security; and rewriting employee screening, hiring and firing policies.
Monitoring for intrusions and preparing legal cases.
Identifying new problems as networks and hacking methods evolve.

HP sets its sights on SNA shops

Company says SNAplus2 gateway supports unlimited host sessions, includes APPN hooks.

By Michael Cooney

Cupertino, Calif.

Hewlett-Packard Co. has decided to take on a couple of the SNA connectivity market's hardest hitters: IBM and Microsoft Corp.

The company last week introduced an edition of its SNA gateway that boasts dramatically higher capacity, as well as related software that can turn an HP server into a peer within an IBM Advanced Peer-to-Peer Networking environment.

HP also announced it has become the first server vendor to complete interoperability testing with Cisco Systems, Inc. to support Cisco's Channel Interface Processor. The Cisco 7000 router adapter gives an HP 9000 machine access to an IBM host at up to 17M byte/sec.

Analysts said the new products and technology enable HP to attack Microsoft's SNA Server and other SNA gateways while also putting a few dents in IBM's Big Iron product line.

Microsoft recently turned the heat up on IBM, too, doubling the capacity of its latest SNA Server release from 2,000 to 5,000 (*NW*, June 10, page 1).

"IBM should feel like it's being invaded," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C. "HP is taking a full-blown application system [in the HP 9000] and tying it directly to the mainframe. This could reduce the need for the mainframe in the long term, but in the short term allows high-speed access to its data."

GATEWAYS AT A GLANCE

Product	HP SNAplus2	Microsoft SNA Server 3.0	IBM NetWare for SAA 2.0
Max. number of host sessions	Unlimited	15,000 (with any host)	2,000 (System/390), 1,500 (AS/400)
Max. number of users	Limited only by memory of machine	5,000	2,000
PC hardware supported	HP 9000	Intel, Alpha, PowerPC, MIPS	Intel
Licensing	In any number of host configurations	In any number of user configurations	In specific 16, 64, 128 and higher user packs

Key to the announcement is the next generation of HP-UX SNAplus2, an HP 9000-based SNA gateway that connects workstations and terminals to an IBM mainframe.

Version 2.0 of the software can support an unlimited number of sessions and users. In the past, SNAplus maxed out at 2,000 sessions.

"We've removed the limits of the software, which will let users consolidate multiple gateways into one large box," said Daniel Charlu, product manager for HP's WAN and ATM products. "Users are now only limited by the size and memory of the HP 9000 server, which can scale to 2G and support hundreds of thousands of SNA sessions."

Scalability and the ability to interconnect SNA and TCP/IP were the two reasons Quebec City chose the HP package. "As we build out our internetwork, we continue to need fast access to legacy applications," said Jocelyn Paradis, a systems analyst with the city. "This package gives us a more streamlined path."

SNAplus2 has also been enhanced to support multiple LAN connections, such as token ring, Ethernet or FDDI, simultaneously. In the past, it could only support one LAN type at a time, Charlu said.

In addition, HP announced SNAplus2 APPN End Node. This, the company's first APPN software, will let HP 9000 servers participate as peers alongside IBM gear in APPN networks. The software also includes support for IBM's dependent LU Requester technology, which enables legacy 3270 traffic to flow over APPN nets.

Analysts said HP needed APPN support to compete for customer accounts vs. IBM's AS/400 as well as vs. IBM mainframes. "HP competes heavily for those accounts and lack of APPN support was a big hole," Dzubeck said.

The company also announced new SNAplus2 terminal emulation software and support for IBM's Advanced Program-to-Program Communications features for applications development.

HP-UX SNAplus2 is available starting at $3,550.

©HP: (408) 447-1673.

SBC rolls out widespread ATM offering

By Tim Greene

St. Louis

SBC Communications, Inc., last week announced widespread availability of Asynchronous Transfer Mode (ATM) service, which initially will be offered at T-3 and OC-3 speeds but will come out in a T-1 flavor early next year for customers with less demanding applications.

With the rollout of its Cell Relay Service (CRS), SBC joins regional Bell operating companies Ameritech Corp., Bell Atlantic Corp., US WEST, Inc. and Pacific Bell in offering ATM service.

Pricing will be on a contract basis, but SBC has set targets to give users a ballpark idea of how much it might cost to get the service for their own networks.

CRS, available now at 45M bit/sec and 155M bit/sec, will be deployed in 12 cities in the five-state SBC area. Switches will be deployed only after SBC has signed its first customer there.

In the first quarter of 1997, SBC will offer CRS at 1.55M bit/sec (T-1), allowing users to extend ATM to sites that do not warrant the higher speed link. In the second half of next year, SBC will offer service interworking that will allow branch offices with ISDN and frame relay links to exchange traffic with net sites served by ATM.

The company initially will offer constant bit rate and variable bit rate qualities of service.

SBC also plans to offer switched virtual circuits which allow users more flexibility in configuring nets.

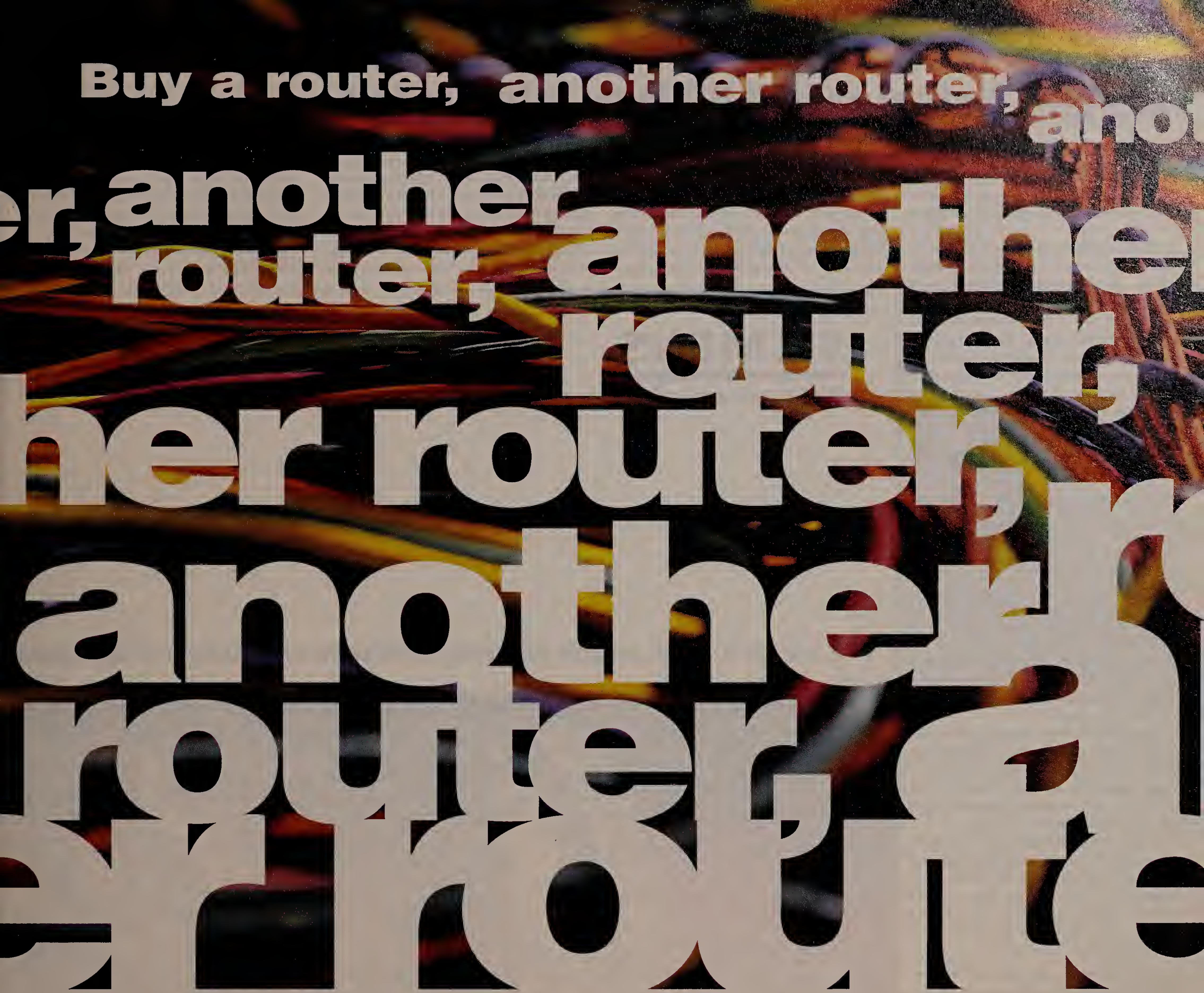
The price of the service depends on several factors, including installation; bandwidth; number of permanent virtual circuits; and the quality-of-service parameters the user chooses.

The service will be offered in the major cities in SBC's area, including Dallas, Houston, St. Louis, Oklahoma City and Little Rock, Ark. ■

SBC joins ATM fray

SBC has set target prices for its ATM Cell Relay Service. Actual prices will be determined on an individual case basis.

	45M bit/sec	**155M bit/sec**
Installation	$600	$565
Per month	$2,700-$3,000	$3,200-$3,600
First PVC	$35	$35
Additional PVC	$25	$25
Outside service area	$600 plus $200 per mile	$700 plus $240 per mile
Constant bit rate	$25/megabit/month	$25/megabit/month
Variable bit rate	$20/megabit/month	$20/megabit/month



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Informix, Netscape and HP form intranet trio

By Carol Sliwa

Netscape Communications Corp. and Hewlett-Packard Co. this week will add a partner to their intranet alliance: Informix Software, Inc.

Informix will provide database software that has been tweaked to install easily and work smoothly with Netscape's SuiteSpot server and Navigator Web browsers as well as HP products such as the OpenView management platform, the partners said. Users will be able to administer their intranets using a Web browser, they added.

Netscape's *Homer says the partnership will help the company in its battle with Microsoft.*

To achieve tight integration with OpenView, Informix implemented the Simple Network Management Protocol management information base for relational databases. It then added unique extensions to allow administrators to manage product features such as parallel processing and static table partitioning using HP OpenView, said Brett Bachman, general manager of Informix's workgroup solutions business unit.

The Silicon Valley database vendor will also offer integrated software installation media so users can run one set of programs rather than having to take a collection of shrink-wrapped software and hand-configure each component.

"It's like the difference between buying an office suite vs. buying best-of-breed productivity applications and then trying to figure out how to get your spreadsheet to talk to your word processor," Bachman said. "And we're trying to do it on an enterprise scale."

Informix's OnLine Workgroup Server, intended for smaller companies, is the company's only product that is now ready for use with its new partners' offerings. Informix plans to enable its higher end OnLine Dynamic Server to work with Netscape and HP products by the end of the month and to do the same for its Universal Server later in the year, a spokesman said.

Both Informix and HP officials said the impetus for forging the alliance was customer demand. But Mike Homer, Netscape's marketing director, said the partnership should help Netscape in its battle with Microsoft for intranet dominance.

"Each one of these partnerships that we do . . . really gives customers a better way to buy our products and integrate them," he said. "Most large customers would like to get significant parts of their solution, or the whole solution, from a single vendor that does integration services and provides all the different pieces."

Netscape already has a limited alliance with Informix. ■

A B E N D

abend *(n)* **1:** abnormal end to a computer process **2:** the online fountain of 'Net wit and high-tech humor found on Network World Fusion (www.nwfusion.com).

It was fun while it lasted

Internet mailing lists are much like romantic relationships. They begin with the giddy excitement of shared passions, mature with the deepening of mutual understanding and respect, and then end amid disillusionment, bitterness and despair. Well, not all mailing lists. But enough to make it worth your while to check out "The life cycle of mailing lists" on Network World Fusion.

Select NetRef then Abend.

NetworkWorld Fusion

SIEMENS

ROLM Communications

If we built a $36 million telecommunications network in the Russian

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Agents

Continued from page 1

work together regardless of the operating system or agent technology on which they are based.

A draft SATP specification should be ready soon, and code should be available early next year, said Tony Rutkowski, vice president of Internet business development at agent software maker General Magic, Inc. and former executive director of the Internet Society.

Intelligent agents are programs that monitor network servers, including Web sites, for information of particular interest to an end user.

Once that information appears, the agent grabs it and delivers it, freeing users from repeatedly hunting for information themselves.

Agents can also be programmed to take action when certain combinations of conditions exist, such as automatically buying or selling a particular stock when it hits a user-specified price.

"Agents are a great idea but haven't gotten too far yet because they have been focused vertically" and got a bit of a false start in the mobile market, said Ameet Patel, manager of systems integration architecture at chemical company BASF Corp. in Mount Olive, N.J. Patel views agents as useful for monitoring competitors' Web sites and automatically triggering messages to customers based on customer profiles.

What is needed is a "sharing of agents across the board for horizontal applications. This requires breaking agents down into [standard] components that can be reused," Patel said.

Because there are no standards, "the whole industry is fragmented," agreed Don Gilbert, manager of IBM's Intelligent Agent Center of Competence. IBM, which is also involved in the SATP effort, put its first general-purpose agent products on the Web in alpha form last week (http://www.raleigh.ibm.com/iag/iag home.html).

"Each [vendor] company writes everything from scratch," Gilbert said. Then, when users want to link applications, they cannot, he added.

WHY AN INTEROPERABILITY SPEC FOR AGENTS IS NEEDED

- ▶ Agents in client apps could talk to many more servers, helping users with an exponentially greater number of tasks.
- ▶ Companies with agents on their Web sites would be able to automatically generate messages to more customers, namely those running agents from a different vendor.
- ▶ Developers reusing agent components could build apps faster.

Agents are caught in a chicken-and-egg development cycle, in which client applications can only work with server applications based on the same agent technology, Gilbert said.

Because of that, third parties and users are hesitant to build client applications.

The SATP effort would not necessarily be limited to IP networks, Rutkowski said. For example, SATP could be hosted on phone company central office switches using Signaling System 7 as the network layer protocol for use over telephone networks, he said. ■

It's something personal

In addition to the agent standardization effort, the World-Wide Web Consortium is looking to develop standards that would allow personal communicators to make better use of the Web.

The small screen size of handheld computers, for example, renders a traditional Web experience less fulfilling. So the Web group is looking to establish standards for common features, such as ways to shift a desktop view or allow a home page to be read, said Tony Rutkowski, vice president of Internet business development at General Magic, Inc. and former executive director of the Internet Society.

In addition to General Magic, he said, several other companies are involved in this effort, including Microsoft Corp., Oracle Corp. and Sun Microsystems, Inc.

—Joanie Wexler

undra, imagine what we did for this guy Pete.

The challenge came in from Gazprom AG, the big natural gas-extraction firm: Would we care to develop and install a comprehensive telecommunications system in the remote far north of the Russian Federation?

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Challenge Us.™

Calendaring

Continued from page 1

we're actually doing it," said one individual involved in the talks. "Whether we incorporate what Lotus is doing will really depend on what they come up with."

Whether the efforts are combined or not, users are likely to benefit. Since any work will be submitted to the Internet Engineering Task Force, analysts said the probable outcome is that an open calendaring standard will emerge by year-end.

An Internet scheduling specification is expected to let users run disparate calendaring clients against the same back-end servers over the Internet and intranets. Down the road, it could enable the sharing of free-time information so users can determine when users of other scheduling systems are available for meetings.

Lotus' chief operating officer talked up the company's ICAP efforts at an Internet briefing at PC Expo in late June. The multivendor talks reportedly began several months ago, but heated up after several vendors participated in an industry conference last month.

Al Morgan, solutions program manager at HP, said, "things are starting to gel on how this spec should take shape." Morgan said a telephone briefing was scheduled for last week to "discuss at a high level what a scheduling spec should include."

Mike Homer, Netscape's director of marketing, said it is premature to discuss any talks his company might be having.

At a recent analyst briefing, Netscape was pushing Internet Message Access Protocol Version 4 as a way to allow calendaring and scheduling products to interoperate, according to Ira Machefsky, an analyst with Giga Information Group.

Sources said Microsoft Corp. is not currently involved with the effort. The company had no comment.

Lotus officials said that although it volunteered to lead the ICAP effort, it is looking to cooperate with other vendors in the formation of the spec.

"Customers are saying they need interoperability, and they want us to drive a standard," said Nina MacIntyre, general manager for calendaring and scheduling at Lotus. "[Moving into the leadership role] was a risky move for us, but our intent is to deliver real value to customers — not get involved in a political process."

MacIntyre's sentiments were echoed by Blane Woodard, information systems manager at Northwestern Mutual Life Insurance Co. in Milwaukee. "All these [calendaring and scheduling] systems are still proprietary," Woodard said, adding that a standard would give companies the flexibility to run disparate clients on the same servers over a corporate intranet.

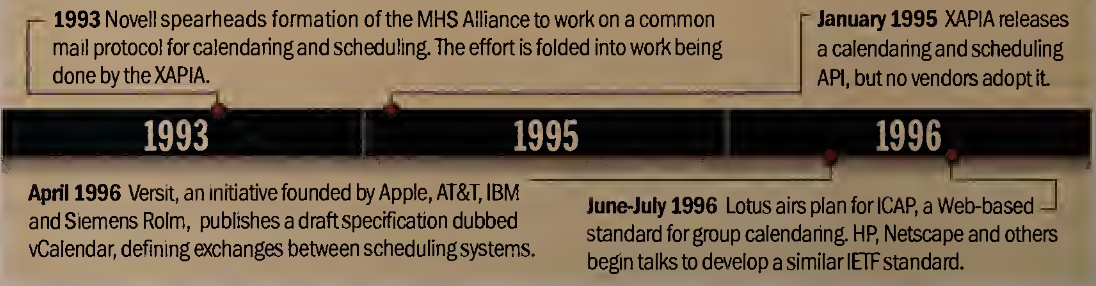
This standards push is not the first for scheduling software. There have been several attempts to develop interoperability standards already, but none have gained widespread support (see graphic).

Most notable are the efforts of the XAIPA, an industry group that delivered its calendaring and scheduling API (CSA) about 18 months ago. That spec was intended to foster integration between desktop applications and scheduling products.

"Nobody really adopted [CSA], mostly because the scheduling market was immature when the spec was released and demand for interoperability was low," said John Rizzi, vice president of On Technology in Cambridge, Mass., a member of the group that sells Meeting Maker scheduling software. ■

LET'S GIVE IT ONE MORE TRY

Group scheduling standards efforts through the years.



1993 Novell spearheads formation of the MHS Alliance to work on a common mail protocol for calendaring and scheduling. The effort is folded into work being done by the XAPIA.

January 1995 XAPIA releases a calendaring and scheduling API, but no vendors adopt it.

April 1996 Versit, an initiative founded by Apple, AT&T, IBM and Siemens Rolm, publishes a draft specification dubbed vCalendar, defining exchanges between scheduling systems.

June-July 1996 Lotus airs plan for ICAP, a Web-based standard for group calendaring. HP, Netscape and others begin talks to develop a similar IETF standard.

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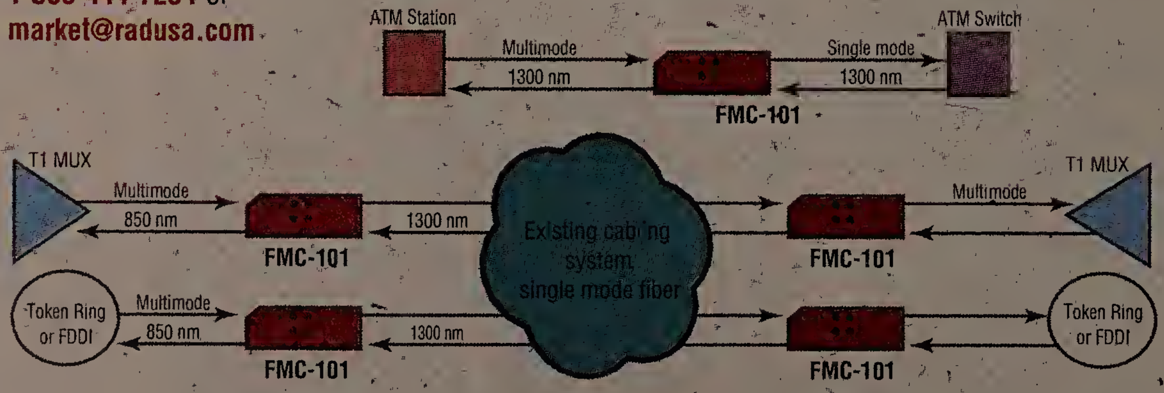

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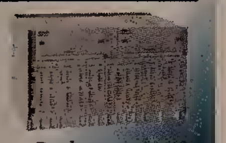

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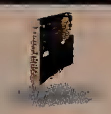
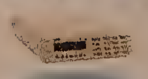


Inverse Muxes
ISU 512

Standalone TAs
ISU 128



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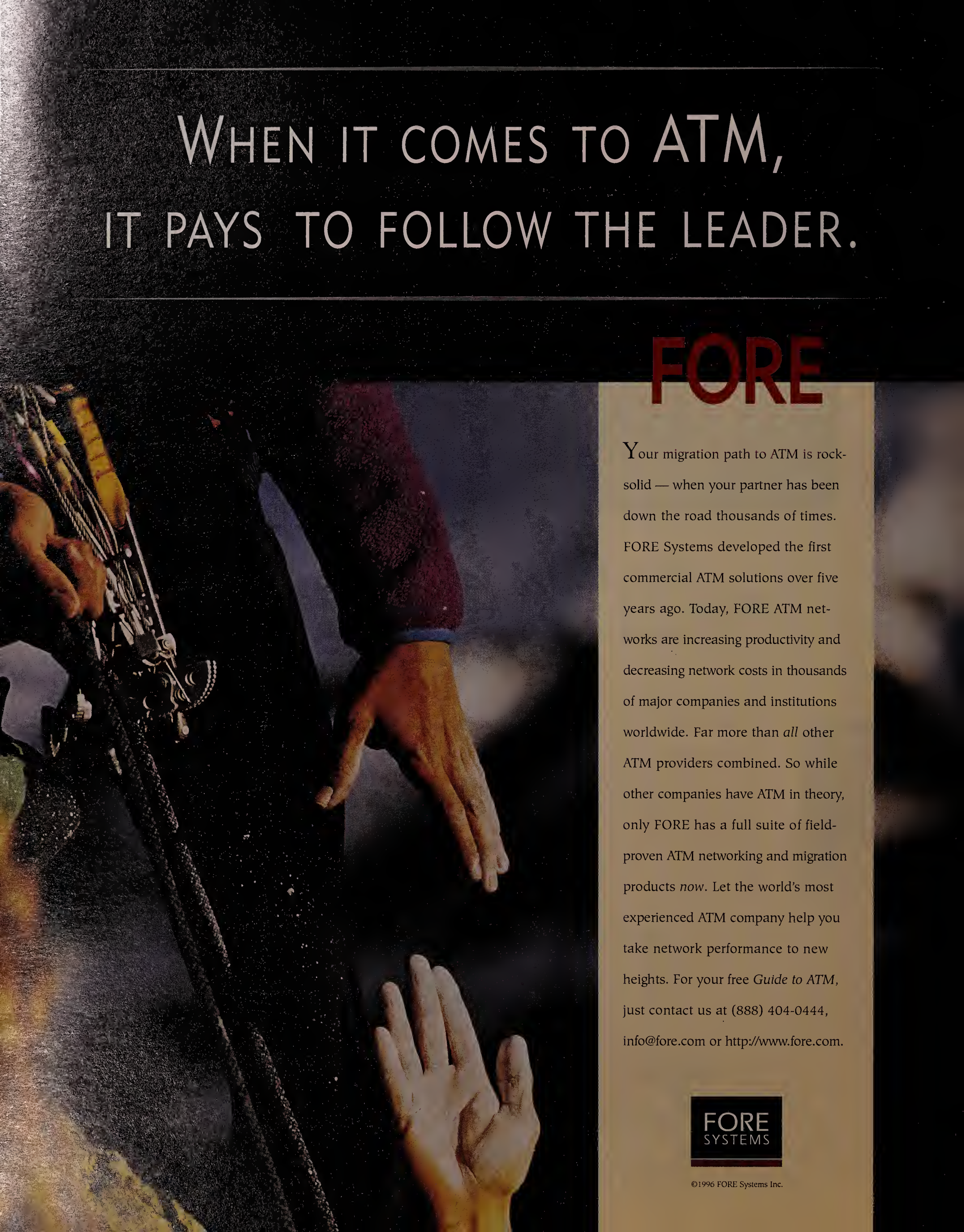

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WANs & Internetworking

Covering: Network Architectures and Management • Routers • Muxes, Remote Access Gear, Modems, PBXs and other CPE • Mobile Computing Products

Briefs

Cambio Networks, Inc. *and* **Quadritek Systems, Inc.** *last week announced an alliance to provide an* **API** *for updating Cambio's physical management application when net changes are made. Quadritek's QIP IP management system dynamically updates the network physical-layout information stored in Cambio's Command database.*

StrataCom, Inc. *has a new box that* **lowers the cost** *of connecting frame relay links to its IPX and IGX switches from $3,000 per port to as low as $511 per port. The Port Concentrator Shelf (PCS) can hold as many as four 11-port cards that support V.24/RS-232, V.28, V.11 or V.35 interfaces. Port speeds can range from 9.6K to 384K bit/sec, with each card handling a maximum of 2M bit/sec. Pricing ranges from $8,740 to $22,500.*

StrataCom: (408) 294-7600.

Platinum Technology, Inc. *last week said its Apriori problem resolution products are integrated with Hewlett-Packard Co.'s* **OpenView IT/Operations** *management framework.*

Platinum: (800) 442-6861.

Amdahl turns up mainframe power

Fiber Optic Service will allow users to build ESCON-based connections to new hosts.

By Michael Cooney
Sunnyvale, Calif.

Amdahl Corp. last week moved to help users build faster, more powerful fiber-based links to its new family of IBM System/390-compatible mainframes.

The company announced a Fiber Optic Service that will help users build Enterprise Systems Connection (ESCON)-based links to its new Millennium mainframes. ESCON is IBM's fiber optic-based mainframes channel connectivity technology. It enables channel connectivity at as much as 17M byte/sec vs. 4M byte/sec with traditional copper cables.

FUN FIBER FACTS

If all the installed fiber in the world were strung together, it would stretch back and forth between the Earth and the moon 28 times.

In bulk, it would take 33 tons of copper to transmit the same amount of information handled by 1/4 pound of fiber.

The ESCON technology also allows high-speed access to mainframe resources via any ESCON-enabled net devices, such as routers or gateways, and storage systems such as direct-access storage device farms.

The company also enhanced its Millennium servers, allowing users to couple two eight-processor servers. This should improve the capacity, throughput and redundancy of the big boxes.

Amdahl claims the new Millenniums are twice as powerful as comparable IBM mainframes.

Amdahl executives envision the Millenniums, which run mainframe operating systems such as IBM's OS/390, in a number of roles — from an applications development platform to a distributed node in a network. They can also off-load the work of existing mainframes or help users migrate older IBM S/370 or Amdahl applications.

The Fiber Optic Service will provide users with complete design, planning and installation of ESCON-based products.

For example, Amdahl will review a user's data center requirements, and then handle everything from trunk and jumper cables to the installation of ESCON directors and adapters.

Amdahl will target large IBM S/390 class users that have multiple data centers and mainframe CPUs. It also will pursue early ESCON users that are looking to modify their current network and others that may be planning to implement ESCON, Amdahl executives said.

The service is available now. Pricing is based on the net size.

The company also announced a new coupling facility that lets users link two Millennium processors together.

"The coupled servers will let users link large numbers of downstream devices as well as provide a level of redundancy on a single system that wasn't available before," claimed John Roberts, a product manager with Amdahl.

Shipments of the Millennium servers will begin in the third quarter. The coupling servers will not be available until the first quarter of 1997. Pricing was not announced.

©Amdahl: (408) 746-6000.

Nortel to carriers: Get on the Internet

By David Rohde

Northern Telecom, Inc. late last month gave the nation's telephone companies a message about the Internet: Instead of fearing it, make it your own by giving corporate users yet another way to use it.

The vendor took the occasion of the SuperComm show — the telephone industry's annual big bash — to introduce Secure Public Dial as a new feature of its Rapport Dialup Switch for carriers.

Due out in the fourth quarter, Secure Public Dial is designed to give laptop and work-at-home users secure access to corporate LANs via the 'Net — if the Rapport switch is installed in a local exchange carrier's (LEC) central office near the remote user.

And from the carrier's perspective, Nortel officials said, this feature means that Internet access traffic can be moved off of the voice network. Such traffic has bedeviled carriers whose traditional switches are engineered for short average call times.

Net managers then can instruct users to stop dialing in to remote LAN access servers via 800 numbers, for which the corporation ultimately pays. Instead, users can employ the 'Net for remote LAN access; net managers do not have to change the LAN addressing schemes.

The reason is that Secure Public Dial supports Layer Two Forwarding, a proposed standard that allows the use of unregistered IP addresses over the 'Net as well as support of PPP encapsulation within IP packets, Nortel officials explained.

"With the addition of Secure Public Dial, Nortel is bringing its public network expertise to the rescue of the LECs while simultaneously offering a meaningful remote access solution to enterprises," said Hillary Mine, senior vice president at Probe Research, Inc., a market research firm in Cedar Knolls, N.J.

Of course, carriers stand to lose 800 business if Secure Public Dial takes off. But that business is mostly held by long-distance carriers, whereas Secure Public Dial is aimed squarely at the LECs. ■

GDC tries its hand at IP switching over ATM

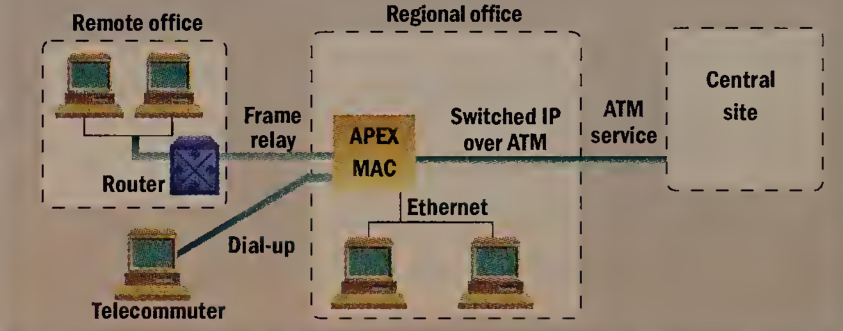
By Tim Greene
Dallas

IP switching gained another disciple late last month when General DataComm, Inc. promised to add support for the technology to its Apex Asynchronous Transfer Mode switches early next year.

With Ipsilon Networks, Inc. software installed in GDC's multimedia access concentrators (MAC) — the smaller members of the Apex ATM product family — users will be able to switch IP traffic over ATM links from remote sites.

Three functions, one box

The marriage of Ipsilon IP switching software and General DataComm ATM switches will give GDC Apex switches support for frame relay-ATM interworking, ATM switching and routing.



Users could employ Apex MACs and MAC-1s, for example, to collect Ethernet or frame relay traffic and concentrate it on ATM backbone links to a corporate IP network.

But that is just part of the GDC plan. Ipsilon software on larger Apex switches could be attractive to Internet service providers (ISP) as a way to battle network slowdowns caused by overloaded routers, observers said.

"An ISP would use the switches to replace three layers of internetwork products: high-density frame relay access, routing and ATM switching," said Esmeralda Silva, a senior analyst with International Data Corp. in Framingham, Mass. The Ipsilon software inspects first-time packets as a router would and determines if they are part of a larger stream. If they are, the stream is switched; if not, the traffic is routed.

Initially, GDC will route using a separate unit. Later, it will switch to a router card that drops into the Apex chassis.

GDC has also introduced a new T-1 multiplexer, the Metroplex 6000, which combines voice and data traffic onto two T-1 lines bound for different destinations. The mux can take a variety of traffic from several sources and put it onto two lines, something users would otherwise have to get from service providers.

Pricing for the Metroplex 6000 starts at $5,000; the product will be available in August.

©GDC: (203) 574-1118.

INTERNETWORKING MONITOR

Scott Bradner

Running in Karnak mode

Johnny Carson used to do a comedy routine on the "Tonight Show" called the Great Karnak. In this bit, Carson, resplendent in floppy turban, would be presented with a sealed envelope said to contain a question. After a bit of deep thought, he would tell the audience the answer. He would then open the envelope and read the question aloud.

Devising the answer before you can clearly see the question seems to be a popular pastime in the data networking community. This is most evident in the trade press, but also shows up quite a bit in the announcements that we see coming out of companies that should know better. It is not a new phenomenon, and I wonder why it is such a hard habit to break.

Just as finding a common enemy in politics can distract people from their real-life problems, the search for common technical solutions seems to stop people from thinking about just what their technical requirements are.

I've previously written about two instances of this phenomenon. ATM and the World-Wide Web have been seen as the answer (now tell me your question) for networks and user interfaces, respectively. The current common solution is the Internet (or its spelling-challenged alter ego, the corporate intranet).

It seems like there is a front-page story every week in this and other trade journals in which a corporation either announces its new Internet-centric strategy or is criticized for not having one. IBM, Microsoft, Digital, Apple and many others have decided that the only future is one that depends on them understanding and dominating the Internet. (That's the way that it gets reported anyway.)

I've been a strong supporter and proponent of the Internet and TCP/IP for quite a while. I've argued that the highly touted National Information Infrastructure and the mystic Global Information Infrastructure would evolve out of the Internet, rather than emerge as new creations that would replace the 'Net, as the pundits of a few years ago were telling us.

Time and *Newsweek* (yes, I know, these should not be confused with technical journals) painted the network of the future as a global video store where customers could view Terminator 17 and Rocky 34 whenever the whim took them. The Internet has always been much more and different than that apocalyptic vision. But as grand as it is, the Internet is not the only answer.

I don't see a reason to expect that the Internet will be the solution to all needs any more than ATM is, or than ISDN, the ISO protocols, SNA, APPN, mainframes and PCs were.

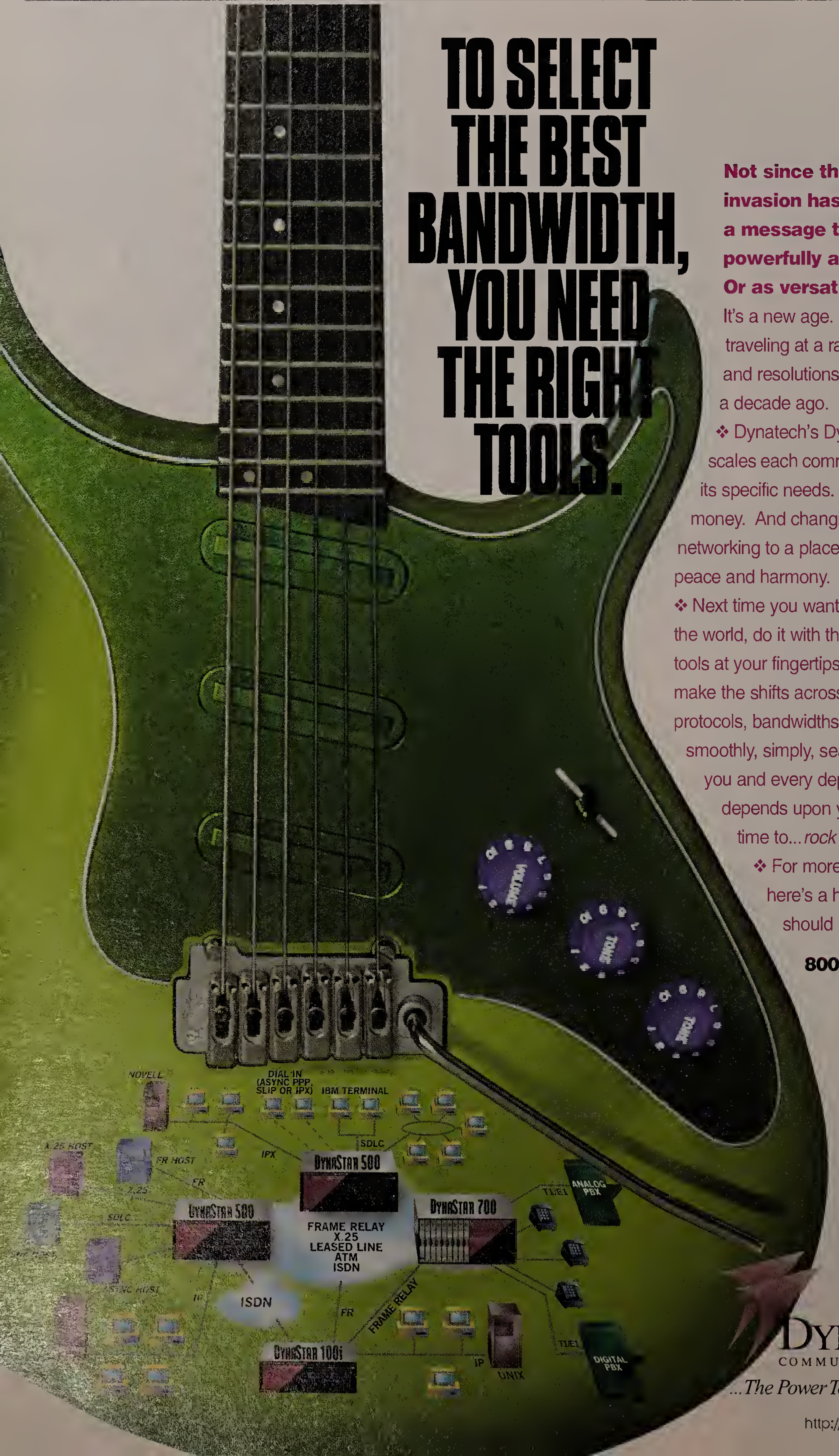
The Internet will not have a billion nodes by the year 2000. (But neither will Novell.) Technologies should be used where they should be used. Don't substitute a common solution for the thought process.

Also note that, in Carson's routine, part of the shtick was that the worse the match between the answer and the revealed question, the better the audience's reaction. We have not reached that point in the pundits' Karnak impersonations, but who knows what the future may bring.

Disclaimer: Common solutions are not easy to come by in an aggressively decentralized place like Harvard, even imagined ones. In any case, the above are my musings.

P.S. The revised URL for Steve McGeady's Harvard talk is http://mcg.media.mit.edu/harvard.html

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.



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Briefs

■ *The* **Illinois Commerce Commission** *has approved an* **interconnection** *agreement between Ameritech Corp. and Bell Mobile Systems, Inc., which operates in Illinois as Cellular One-Chicago. One of the first agreements in full compliance with the federal Telecommunications Act of 1996, it calls for Ameritech to pay Cellular One for calls Cellular One terminates for Ameritech.*

■ *Federal Communications Commission Chairman Reed Hundt indicated he is inclined not to put restrictions on vendors of Internet telephone software or make* **Internet service providers** *pay* **carrier access charges.**

"We shouldn't be looking for ways to subject new technologies to old rules," FCC Chief of Staff Blair Levin, who was speaking for Hundt, told the recent INET '96 conference in Montreal.

■ **Northern Telecom, Inc.** *has announced a $16 million agreement to sell Magellan ATM backbone and edge switches to* **MCI Communications Corp.** *The installation of the new gear is designed to help MCI move toward a OC-12 (622M bit/sec) ATM backbone to consolidate traffic from a variety of public-network services.*

■ **WorldCom, Inc.** *has expanded its* **frame relay service** *to Amsterdam, Honolulu, Montreal and Vancouver. It plans to add Brussels, Madrid, Milan, Seoul, Singapore, Stockholm, Taipei and Zurich later this year.*

■ **LCI International, Inc.** *has acquired the* **commercial long-distance assets** *of Pennsylvania Alternative Communications, Inc., based in Greensburg, Pa., for an initial $7.8 million. The Pennsylvania carrier recorded 1995 long-distance revenue of $14 million.*

3M test-drives AT&T Uniworld VPN

Multinational beta user worked through line, billing and local support problems.

By David Rohde

Dallas

Network managers who decide to create global virtual private networks as extensions of AT&T's Software Defined Network (SDN) will want to thank Malcolm Wollaston for working out the kinks.

Wollaston, manager of global telecommunications information technology at 3M Corp., is now running an 11-country pan-European VPN that supports some eight million minutes of usage per year.

As a beta user of the AT&T-backed Uniworld venture's international VPN service, Wollaston pronounced the service ready for prime time at the recent International Communications Association convention here.

"After years of talking about one-stop shopping, you can actually buy it now," Wollaston said.

He admitted to some early problems contending with dropped calls, poor line quality, inflexible billing and a continuing problem with local service in some countries.

But the benefits are substantial. He now has a global calling plan that is fully integrated with 3M's 132-node domestic SDN in the U.S. The entire network, known as 3MNet, provides abbreviated dialing around the world without relying on expensive international direct-dial or even more expensive international private lines.

The trial, which began last September, got off to a good start. "We probably couldn't have had a more aggressive timeline," Wollaston said. The company wanted to bring up 13 sites in 11 countries virtually overnight, and the only delay turned out to be an access circuit in Austria.

But then, in four countries — Belgium, Netherlands, Germany and the U.K. — callers experienced "unacceptable levels of echo," Wollaston said. It took until late November for Uniworld's network stabilization plan to kick in, Wollaston said.

In the meantime, 3M opened nearly 35 trouble tickets a week with the Uniworld organization in early October, though that number dropped to about five per week by early December.

Billing was another headache. "The billing did not meet agreed expectations," Wollaston said, though he conceded that might have been because 3M wanted its bills delivered in the currency and language of each location.

An even bigger concern was customer support at the local sites, particularly those not provided by the four Uniworld European carrier partners — the government-backed carriers of Sweden, Netherlands, Switzerland and Spain. "The customer care wasn't really in place," Wollaston said. He cautioned that he still considers Uniworld an "inexperienced young organization," though he described the central account team for 3M as excellent.

He advised potential global VPN users to work through the London-based European VPN Users Association (EVUA), which originally contracted on a group basis with AT&T and British Telecommunications plc and is now considering adding the services of Global One — the Sprint Corp.-backed venture — and SITA, the airline consortium. Among other things, the 53-member EVUA provides a model service level agreement and legal support from the Washington, D.C. law firm of Wilmer, Cutler & Pickering.

☎EVUA: 44-1372-361-000.

3M's report card to Uniworld

How 3M's Malcolm Wollaston graded AT&T's Uniworld venture following his beta test of Uniworld's global VPN service:

Subject area	Grade	Current status	Explanation
Network performance	Growing Pains	Network stabilization plan has solved problems	Unacceptable levels of echo, call cut-offs
Billing	Below expectations	New billing system just delivered	Lacks summary details; some calls unaccounted for
Uniworld centralized customer care	Meets expectations	Fully satisfactory	Open continuously; proactive approach
Local customer care in each country	Below expectations	Working to build experience	Not fully deployed; support tools not always available

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Frame relay services

SNET first LEC to resell IXC data services

By Joanie Wexler

New Haven, Conn.

SNET America, Inc. today will announce it has stretched its frame relay service around the globe.

The independent phone company in Connecticut has become a bona fide reseller of interexchange carrier (IXC) EMI Communications, Inc.'s frame relay service. Thus, SNET customers already enjoying the cost benefits of local frame relay service offerings can now turn to the same local carrier for long-haul frame relay circuits.

The SNET-EMI contract marks the first instance of a local exchange carrier (LEC) reselling an IXC's data services. Similar arrangements, however, are cropping up for voice and some comarketing of data services is also taking place (see graphic).

Users of local frame services "have typically had to solicit another carrier that has a [Network-to-Network Interface] agreement with their carrier and provision a second service" with separate management, billing and trouble ticketing, said Liza Henderson, broadband consultant at TeleChoice, Inc., a consulting firm in Verona, N.J.

EMI is working on similar deals with most regional Bell operating companies, though, said Mark Pugerude, director of marketing and product development for EMI.

EMI — which is being bought by carrier Intermedia Communications, Inc. (ICI) in Florida — is a regional IXC that serves the Northeast. But EMI and ICI are members of the UniSpan frame relay consortium, which comprises several domestic and international net operators that link up to offer frame services throughout the country and overseas.

For now, the basic EMI frame relay transport, disaster recovery and customer network management options will be available to SNET customers, said Gregory Williams, SNET product manager.

But SNET has many of EMI's services, such as voice and SNA over frame, in development, he said. ■

Crossing boundaries

Some LEC/IXC business deals:

LEC	IXC partner(s)	Nature of deal
Ameritech	WorldCom	LEC resells partner's long-distance voice services.
BellSouth	ICI	Co-carrier interconnect: ICI sells local voice and data services in all BellSouth states.
GTE	WorldCom	LEC resells partner's long-distance voice services.
SNET	1) EMI 2) WorldCom 3) MFS	1) LEC resells frame services. 2) LEC reference-sells frame services. 3) LEC markets ATM LAN-interconnect services.

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Local Networks

Covering: Operating systems • LAN management
Hubs • Switches • Adapters and other equipment

Briefs

FastLane Technologies, Inc. *of Ottawa has rolled out a new version of its Final directory management tool for* **Windows NT Server.** *Final 5.0 taps into Windows NT Server Access Control Lists and lets a manager deny an individual access to an account while keeping it open to others.*

The new version also lets an administrator access the server's registry and perform asset management queries and synchronize entries for all machines in multiple domains. Available now, Final 5.0 starts at $2,685 for a single domain license.

FastLane: (800) 947-6752.

Miramar Systems, Inc. *last week announced a version of its* **PC-to-Macintosh** *peer-to-peer software that uses Windows 95's security features. PC MacLAN for Windows 95, which allows Macintosh and Windows 95 users to work collaboratively via a 32-bit AppleTalk protocol stack sitting on the Windows 95 client, contains a properties page that allows users to define their peers' access to data resident on the PC.*

The software ships later this month and is priced starting at $199.

Miramar: (800) 862-2526.

Snap-In Softools, Inc. *of Tucson, Ariz., has a new server management utility that lets administrators schedule and automate tasks on their* **NetWare 3.X and 4.X** *servers. Snap-in AutoAttendant helps reduce downtime by enabling server tasks, such as loading and unloading of NetWare Loadable Modules, to run at times when users do not need to access the server.*

Snap-in AutoAttendant is available now for $99 for a one-server license and $2,499 for a 100-server license.

Snap-In Softools: (520) 292-9881.

XLNT to toss hat into gigabit Ethernet ring

LAN vendor to roll out 1G bit/sec uplink module and switch.

By Jodi Cohen
San Diego

LAN switch vendors are scurrying to develop products that will let them compete in the emerging gigabit Ethernet market, and XLNT Designs, Inc. expects to be at the front of the pack.

XLNT will start shipping in May 1997 a gigabit Ethernet uplink module for its QuikEther family of Ethernet, Fast Ethernet and FDDI switches.

The company will also roll out a multiport gigabit Ethernet switch in September of next year, enabling customers to build 1G bit/sec Ethernet backbones.

Getting behind gigabit Ethernet

A sampling of Gigabit Ethernet Alliance members.

- 3Com
- Bay
- Cabletron
- Cisco
- Compaq
- Digital
- Granite Systems
- HP
- Intel
- Ipsilon Networks
- Madge Networks
- NBase
- Packet Engines
- Prominet
- Sun
- XLNT Designs
- Xylan

The products will comply with the evolving gigabit Ethernet standard being worked on by the IEEE 802.3z committee. The standard is not expected to be complete until late next year or early 1988.

XLNT, founded in 1989, figures it will have a jump on many of its competitors.

"We anticipate offering a total gigabit Ethernet solution more quickly than anybody else," said William Atkinson, president and chief executive officer at XLNT, based here. "Our gigabit Ethernet products will build on our existing switch technology, so we won't be starting from scratch like the start-ups. And since we're a small company dedicated to R&D, we can move more quickly than the big vendors."

XLNT, an OEM supplier to 3Com Corp., Bay Networks, Inc. and Cisco Systems, Inc., typically competes on price by offering chassis-like functionality at workgroup prices, industry observers said.

The gigabit Ethernet market is sure to get crowded quickly, with a slew of start-ups and established vendors plotting strategies. Many of the industry's LAN switch vendors already have thrown their weight behind the technology by joining the Gigabit Ethernet Alliance.

Gigabit Ethernet, which is expected to cost about twice as much as Fast Ethernet and about the same as Asynchronous Transfer Mode, will be used to link 100M bit/sec workgroup switches and for high-speed server links.

XLNT is betting on gigabit Ethernet — not ATM — to win in the LAN. Atkinson said extending Ethernet to higher speeds makes a lot of sense from a corporate point of view.

NetworkWorld Fusion
http://www.nwfusion.com

Download articles and primers on gigabit Ethernet from Network World Fusion

Select News+ then Local Networks.

"There is a huge installed base of Ethernet customers out there that are going to be loath to make a change," Atkinson said. "They are familiar with the technology, have a huge financial investment in it and would like to keep it to solve their network needs."

But Tom Bain, research analyst at the META Group, Inc., a consultancy based in Stamford, Conn., is not quite ready to endorse gigabit Ethernet.

"If all you care about is data, then all you really need is a big, fat, fast data pipe, and gigabit Ethernet should be fine," he said. "But if you have any interest in integrating multimedia, then ATM is the obvious choice."

However, many industry observers said gigabit Ethernet will likely stall ATM deployment and may even preclude the need for ATM in the LAN.

Pricing has not been set for the gigabit Ethernet uplink module or switch.

©XLNT: (800) 956-8638.

Compaq's view on the state of the server

Compaq Computer Corp. is the dominant player in the PC server space, boasting a market share more than twice that of its closest competitors. *Network World* Staff Writer Ben Heskett recently sat down with Ross Cooley, Compaq's senior vice president and general manager for North America, to discuss what's ahead for Compaq.

What do customers want from you as they make use of Internet and intranet technologies?

What they're looking for is to segment the public and private 'Net. Therefore, you see Compaq do things like invest in emerging technologies [like firewall vendor Raptor Systems, Inc.]. All we're trying to do there is get a technology commercialized, perhaps, before it might have been had we not made an investment. To do the intranet-ready server is another indication of us responding to what the customer is saying is important.

There is a lot of talk about consolidating the router and hub in a server. Where does that stand at Compaq?

Customers for a long time have been asking us 'Why can't you do to the hub and router market what you did to the server market?' There's an opportunity and that was one of the motivators behind the acquisitions of NetWorth and Thomas Conrad — to bring the same high-volume orientation that we have to the hub and router world that we did in the file server world.

One of the reasons why we put the vice president who runs those businesses — Thomas Conrad and NetWorth — into our systems division was to ensure that our engineers cross-pollinated; that we had future server designs comprehending what's going on in hubs and routers. That ultimately will produce the kind of product we're hearing CIOs and IS managers talking about.

Compaq's *Cooley discusses the 'Net, routers and client/server.*

When do you see this coming to fruition?

It's all design talk now, so you're talking probably 1997. The market is clearly heading in that direction.

Does the Pentium Pro bring the PC server into the high-end space dominated by RISC and Unix machines?

It's got the horsepower to do that. The clustering really does, however, become the harness you can hook all these horses up to and use to resolve the high-end question in the minds of many CIOs. Until then, we'll do many more mixed environments. It's not uncommon to see large transactional requirements that are being done by mainframes, [Hewlett-Packard Co.] 9000s or [IBM] AS/400s where we would coexist as the application server around them and use them for the large database engine.

The state of networking and the role of the server: How is it changing and evolving?

To this point in time, the server in many ways has been a scaled-down version of the mainframe, although there is intelligence in the nodes beyond any doubt.

Today, we are on the cusp, via client/server, of seeing much more sharing going on, really a distribution of labor between the server and the person on the other end that needs the information. ■

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NET RESULTS

A celebration of network independence

It was about 220 years ago that we sent King George and his boys scurrying across the Atlantic, and celebrated the first day of American independence.

To celebrate this memorable day in the history of our fair country, we thought making a tribute to independence brought about by networking was in order.

America is the country where networking originated. We are home to the fathers and mothers of technology. We are the originators of Ethernet, of FDDI and of switching, bridging and routing. We are the inventors of the network adapter card, the repeater and the hub.

We are, in fact, the creative center of networking throughout the world.

To many of us, this technology is the basis for our jobs and primary focus of our days, but it is more than that.

Skip MacAskill and Melinda Le Baron

Networking has freed the average worker from serious drudgery. A company memo no longer has to be composed on a typewriter, copied on the copy machine and distributed by the internal mail service. Yes, there is electronic mail.

Information can be shared in files over the network — not through a myriad of copies through the mail. Networking has changed the face of business. It has increased the productivity while decreasing repetitive tasks. It has become a critical part of accounting, manufacturing, purchasing, marketing and sales.

But even with all of this independence going on, we realized that the ones who are not independent are those of you managing the network. We thought that this tribute needed more than just our thoughts and feelings, so we went to you, the readers, to find out what types of things you would like to be independent of when it comes to networking.

The responses were many and varied, but we would like to share a few with you:

■ John Doe, 28, network technician, Southern California: "I would like to be independent of my beeper, man. It always goes off when I am doing something gnarly like shootin' the curl or pickin' up babes. It is so heinous."

We offered to answer John's beeper calls on the Fourth of July, but his management turned us down, muttering something about analysts and freezing over.

■ Mary Ribero, 37, network architect, Boston: "The people who had this job before me had an unnatural attachment to Arcnet. Therefore, I would love to be independent of my installed base. If I could just forklift it all out and start over, life would be good, indeed."

Well, Mary, there is nothing that we can do about that but agree wholeheartedly and keep our fingers crossed.

■ Sam Doyle, 52, chief information officer, New York: "I would love to be independent of my budget. With no budget constraints, I could make this network hum. And oh, by the way, now that we're at it, I would like my chief executive officer to stop reading the trade press, too. If I get asked just one more time when I am going to implement gigabit Ethernet, I'm going to scream."

Well, Sam, outside of winning the lottery, we can't help with the budget. And as for the trade press, what can we say?

Hope you had an explosive Fourth of July.

Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at inquiry@gartner.com or (203) 316-1111.

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WIRED WINDOWS

Keeping up with software updates

Software in the age of Windows is far different from that used in the era of DOS 2 or 3.

Then, the few files installed besides .EXE files were almost always stored within an application's directory tree. Few programs, if any, shared files. Updating and troubleshooting were relatively easy. Tech support was just an 800-number away.

As software got more complicated, tech support became more costly for the vendor. Free support migrated to online services, the 800 number changed to one requiring a toll call, and the support person became just as likely to ask for a credit card number as your serial number.

Then, just as you got comfortable searching CompuServe for Microsoft Corp. software updates, the vendor pulled out of that service and forced you to become an expert at reading Usenet conferences.

Not to worry. There are new ways available, or coming soon, to speed the search for updates.

Microsoft will introduce Answer Station in the next rollout of Windows 95, due this fall (*NW*, June 24, page 1). Used in conjunction with a VoiceView-compatible modem, it will allow the Microsoft software engineer to check files on a user's computer while speaking to him or her.

If you've ever tried to talk a user through a troubleshooting session using the telephone alone, you know how much faster it can be if you can see the user's desktop and manipulate it yourself. The usual wailers and teeth-gnashers are, of course, up in arms over this "intrusion" by Big Brother into your personal space. But just as with the Win95 registration wizard, AnswerStation won't do anything you don't know about and approve.

Visit http://www.microsoft.com/support for more information.

CyberMedia — the folks who brought you First-Aid and FirstAid 95 — has also rolled out software to keep you apprised of updates and fixes for your software and hardware.

Dave Kearns

When it's installed, the company's OilCan offering builds a database of the products you have installed, their versions and the versions of their installed files. Visiting the OilCan Internet site will get you a list of, and the opportunity to download, updates and fixes for your products.

Alternatively, the registration information can be sent to CyberMedia, and you'll be notified when new files for your products are available. Visit http://www.cybermedia.com/ for details.

If you feel queasy about telling Microsoft or CyberMedia what you have installed, consider subscribing to the NetNotify electronic mail list. This free subscription service notifies you of new files, updates, fixes, products, contests and more on a biweekly basis with no further effort on your part except to read your incoming mail.

Tip of the week

Coming soon on the Internet will be the Tech Support Yellow pages, a listing of phone numbers, E-mail addresses and URLs for a host of hardware and software vendors. It will be produced by CyberMedia, the company behind First Aid 95 and First Aid 95 Deluxe (http://www.cybermedia.com/).

Subscribe by sending E-mail to majordomo@ki.net with a message body of "Subscribe netnotify."

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

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PC MAGAZINE EDITORS' CHOICE June 11, 1996 QMS 2425Ex Print System

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Client/Server Applications

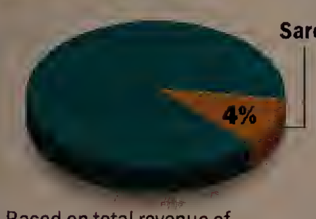
Covering: Databases • Messaging • Groupware
Conferencing • Imaging • Multimedia • Development

Briefs

■ **Saros,** *a division of FileNet Corp., next week will ship Saros Document Manager 4.0, an upgrade to its* **document management** *system that is now integrated with the company's imaging software and supports replication. Version 4.0 also allows users to create compound documents, which consist of multiple files from different applications that are linked to form a single document. The software costs $495 per workstation, and includes a World-Wide Web access module. Saros Replication costs $2,500 per server.*

Saros: (206) 646-1066.

WORLDWIDE DOCUMENT MANAGEMENT MARKET



Based on total revenue of $268 million.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

■ **Hewlett-Packard Co.** *of Palo Alto, Calif., plans to begin bundling a free copy of its OpenMail* **messaging software** *with its Windows NT-based servers by next year. Also in 1997, the company will roll out a version of OpenMail that complies with the Department of Defense's Defense Messaging System guidelines.*

HP: (415) 857-1501.

■ **Enigma, Inc.** *of Wellesley, Mass., last week announced Insight into Information 3.0, an upgrade of its* **text retrieval software** *that now includes a compound document viewer and automatically converts word processing files in common formats into Enigma's text database format. Used to publish large volumes of data over nets or onto CD-ROMs, it runs on Windows clients and servers, though CD-ROMs developed using Insight may also be run on Macintoshes. Available now, Insight 3.0 costs $7,500.*

Enigma: (617) 239-8279.

GroupWise 5.0 beta testers high on NDS hooks

Administrators can manage GroupWise from NetWare management interface, share folders across network.

By Barb Cole

Beta testers of Novell, Inc.'s GroupWise 5.0 give the software high marks for its integration with Novell Directory Services (NDS) and document management capabilities.

GroupWise 5.0, due later this summer, is a significant release: It is the first client/server version of the messaging and groupware system. Like previous versions, it brings together electronic mail, group scheduling and to-do lists.

GROUPWISE BETA USER FEEDBACK

"The user interface has been improved a lot. It used to be that every time you did something, [GroupWise] brought up a new window on the screen. Now it is more tightly integrated [through its Universal client]."
Jeff Peltier, Sabre Group

"The only other messaging system that has anywhere near the integration with an operating system is [Microsoft] Exchange, and it is behind [GroupWise]."
Jim Shaw, CompNet

"The single point of administration [for GroupWise and Novell Directory Services] makes my job as a network administrator easier."
Brandon Heess, Intuit

Beta tester Jim Shaw, operations manager at CompNet, Inc., a systems integrator in Burbank, Calif., said tighter integration between GroupWise and NDS makes the software easier to manage. He said all GroupWise administration — including the management of messages, end users and gateways — can now be done from NW Admin, NetWare's graphical administration tool.

Previously, GroupWise administration was done using a combination of a DOS-based utility and NW Admin. Tasks such as adding gateways were cumbersome because, though administrators could manage user access to the gateway from NW Admin, they had to install the gateway and create links to other mail systems using the DOS utility, Shaw said.

In addition, creating new GroupWise user accounts from NDS will be easier in Version 5.0. "If you're adding a new user on the NDS side, you can click a button and a GroupWise account will automatically be created," said Angie Jacobs, lead user services specialist at Auburn University in Alabama, which is a beta site for the software.

Beta tester Brandon Heess, network administrator for operations at San Diego-based Intuit, Inc., said GroupWise 5.0 affords more flexibility in the way post offices are set up. The company is looking to migrate about 1,000 users at that location away from Lotus Development Corp.'s cc:Mail. "You can set up the post offices so that it's easier to isolate problems and fewer users are affected when you do maintenance," Heess said.

Grab more info on Network World Fusion, including:
- New GroupWise pricing
- A look at groupware interoperability
- Articles on migrating to client/server messaging

Select News+ then Client/Server Applications.
NetworkWorld Fusion
http://www.nwfusion.com

"GroupWise 5.0 has a lot of features we've been asking Novell for," said beta tester Jeff Peltier, senior programmer analyst for distributed system services at the Sabre Group, a subsidiary of American Airlines in Fort Worth, Texas.

Specifically, the ability to exploit TCP/IP as the client-to-server protocol means that Sabre will not have to send traffic based on the more bandwidth-hungry IPX/SPX protocol across its WAN when it moves about 12,000 users to GroupWise.

Peltier added that Sabre will exploit the shared folders and document management capabilities in Version 5.0 to more efficiently disseminate information as part of a daily electronic publication sent to all employees.

"Currently, we're sending a mail message and attachment to every user. The shared folders and documents will allow us to put it out there one time where users can access it," he said. ■

Unify jumps on Java bandwagon

By John Robinson

San Jose, Calif.

Unify Corp. last week unleashed a tool designed to let developers generate Java code for applications that run on both Web and non-Web clients and servers.

Vision/Web, when used with the latest release of Unify's Vision application development environment, generates Java code without requiring any Java programming, the company said.

Developers need only create applications in the Vision environment with the Java guidelines function selected, and Vision will generate Java applets for browser clients and Vision code for all other clients, said Tony Lacy-Thompson, director of product marketing.

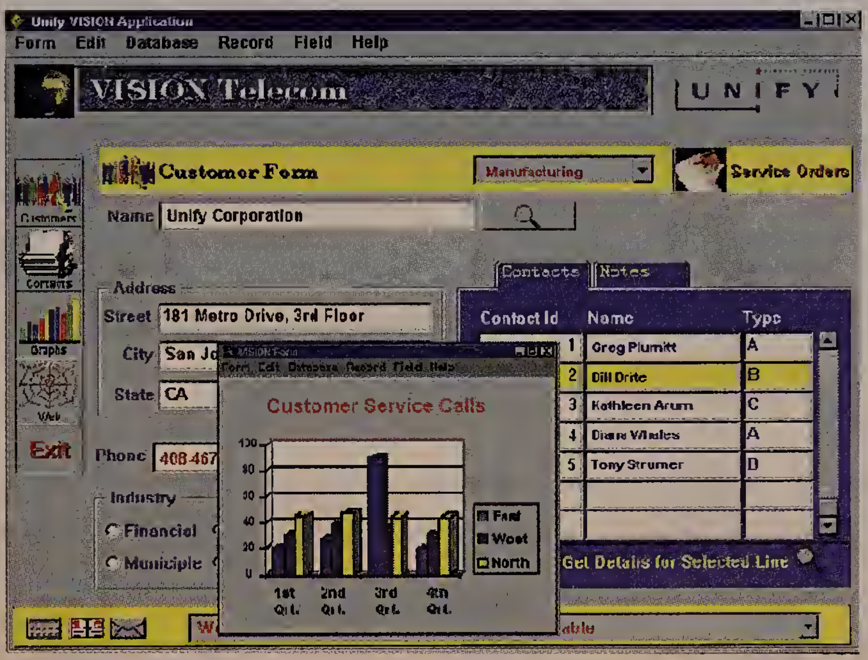
Vision/Web clients also use the Common Object Request Broker Architecture-compliant Internet Inter-ORB Protocol, enabling multistep client/server transactions over HTTP and reducing network traffic, he said.

Vision 3.0, which the company also announced last week, boasts advanced partitioning capabilities, including replicated applications services that enable parallel operations on different machines. It also includes load-balancing and fail-over capabilities for mission-critical applications.

In addition, Vision 3.0 includes support for OLE, Windows 95, OS/2 Warp and DB2 on OS/2, AIX, MVS and AS/400. Previously, the software supported Windows 3.1, Windows NT, Macintosh and Unix.

Vision/Web costs $17,000 per develpment site and will ship in November. Vision 3.0, scheduled to ship in August, is priced at $7,200 per development license for the first five licenses. Additional licenses cost $4,995.

©Unify: (408) 467-4500.



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2	Dill Drite	B
3	Kathleen Arum	C
4	Diana Wiades	A
5	Tony Strumer	D

Vision 3.0 *applications such as customer ordering can now be accessed over the Web.*

SHARED LOGIC

Happy anniversary, IBM and Lotus

It's been about a year since IBM bought Lotus Development Corp., making it a good time to examine how successful the marriage has been so far.

The companies got off on the right foot, designating SmartSuite, Notes and cc:Mail as strategic products and killing off duplicate products at the parent company. Anything else would have been a mistake, resulting in wasted resources and marketplace confusion. Focusing resources on Notes and cc:Mail has allowed these products to flourish while positioning IBM as a player — at last — in the LAN electronic mail and groupware arena.

In addition to making the right strategic choices, IBM and Lotus have been working to exploit the synergies between their respective product lines. After just one year, one can't expect too much, but already a Notes link to IBM MQ Series middleware and a few new Notes data pumps have been developed to follow through on a vision of Notes front-ending the enterprise through a diverse array of LAN-based and remote clients.

This vision combines Notes' strength as an enterprise workgroup server with IBM's strength in enterprise data repositories, transaction processing systems and legacy applications.

IBM is also establishing sales force incentives to sell both IBM and Lotus products, as well as investigating opportunities to integrate SoftSwitch Central with other IBM products. However, when dealing with IBM on large enterprise client/server messaging buys, the process still feels a bit like working with three companies: Lotus for Notes, SoftSwitch for gateways and IBM for hardware.

With Notes, SoftSwitch, cc:Mail and IBM's lock on the enterprise, IBM/Lotus spans three generations of electronic messaging technology and is clearly the market leader. However, IBM/Lotus is a relatively weak leader, under constant attack from Microsoft Corp. on the one hand, and an emerging generation of Internet/intranet messaging and groupware vendors on the other.

Daniel Blum

Looking to the future, it's clear that this market leader cannot afford to stand still. IBM's strategy is to simultaneously make Notes the best distributed Web publishing environment in the industry and the best solution for interworking with legacy systems.

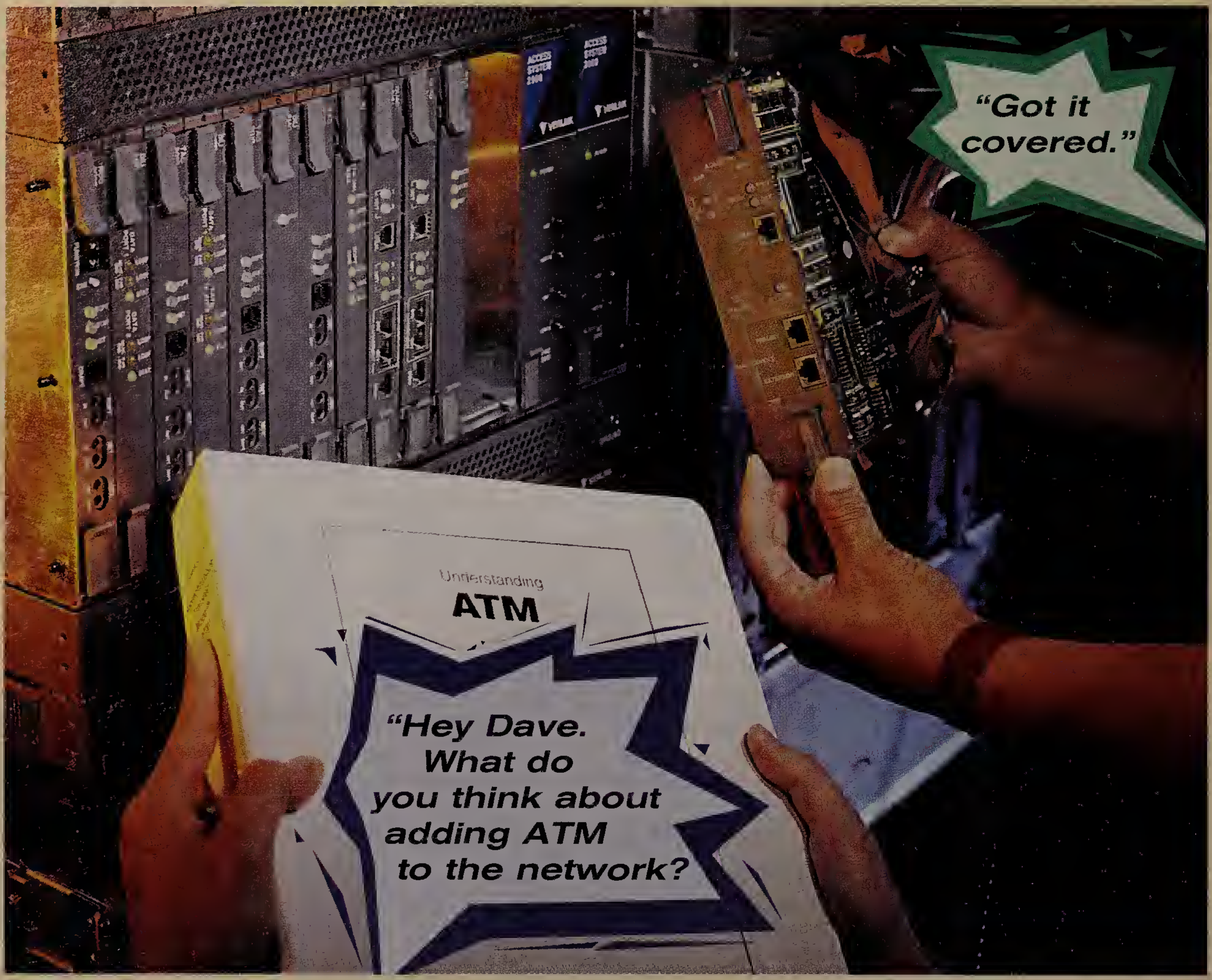
Notes' momentum remains strong, affording IBM/Lotus tremendous opportunities. However, Lotus clearly senses the danger that Notes may lose ground because of its age and proprietary architecture. To hedge its bets, the company has announced a line of Domino II Servers, to be built entirely on Internet standards and protocols, including TCP/IP, HTTP and the Simple Mail Transfer Protocol.

It is significant that Lotus may be moving toward promoting Domino (now a code name) as a new brand; that is, something more than another tentacle on the octopus called Notes.

IBM is also hedging its bets, not relying on Notes as its only channel to the Internet. Big Blue will resell the Netscape Communications Corp. Web server on the RS/6000, and also offer its own Internet Connection Servers on the Solaris, HP-UX, Windows NT and OS/2 platforms. In addition, IBM is an active Java player.

A year may not be a long enough time period by which to judge a merger or a marriage, but if one considers a mixture of common interests and independence to be healthy, then Lotus and IBM seem to be a good couple.

Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached at dblum@interramp.com.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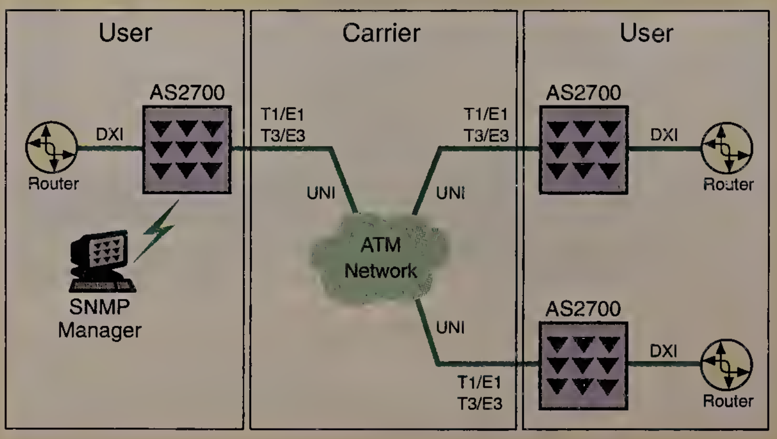

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Microsoft is getting into the middle again

And why not? Demand for middleware is on the rise, and rivals IBM and Digital are already in the market.

By John Cox

Microsoft Corp. is getting ready to crash another party.

Novell, Inc. knows how it feels to have the Redmond, Wash., party animal swing by unexpectedly, as do Internet upstarts that have watched Microsoft stroll into their gala sociably late only to become the life of the party.

Now message-oriented middleware vendors and customers will have their turn, as Microsoft has added the middleware market to its busy social calendar.

“Microsoft will reshape the market,” said Roy Schulte, vice president of system software technologies at market research firm Gartner Group, Inc. in Stamford, Conn.

This is despite the fact that the company has not even announced a product and may not have one out until 1998, analysts said.

But the fast-growing middleware market is young and impressionable. Both the role that middleware will play in corporate networks and the companies that will supply middleware products have changed constantly since the market emerged several years back. So there is no reason to think Microsoft won't be able to have as big an impact on the middleware market as it has in others.

Message-oriented middleware creates a system for applications to interact with each other by exchanging messages over a network. Typically, these asynchronous middleware products offer services to make sure messages are delivered, even in the face of network outages.

Increasingly, middleware is being seen as a way to bridge new distributed client/server applications with existing mainframe ones. Even more recently, MIS managers have seen messaging middleware as a way to bring higher reliability and more robust application services to the Internet.

Swooping in with Falcon

This all may fit nicely with Microsoft's plans to offer a middleware product that differs from those currently on the market.

Microsoft's product, code-named Falcon, is expected to enter beta testing late this summer, according to analysts who have been briefed. But Microsoft has not officially announced an offering to date.

The software is not expected to be delivered as a stand-alone product, but rather as an extension to the company's Distributed Component Object Model (DCOM) technology. DCOM lets COM objects, such as OLE and ActiveX controls, interact over a network and is a key technology in Microsoft's effort to help companies build distributed applications.

You can bank on it

Banks and financial services companies have been among the most advanced users of message-oriented middleware. Here are some of the key benefits of the technology reported by MIS managers at these companies:

- Eliminates the need for applications to wait for a response.
- Messages are transmitted reliably via queues even if a link is broken.
- When a failed system comes back up, so do messages.
- Price and performance are favorable, compared with synchronous messaging.
- Allows interoperability among multiple platforms at the same time (or almost the same time).
- Gives legacy systems new life.

SOURCE: WINTERGREEN RESEARCH, LEXINGTON, MASS.

Falcon will introduce an asynchronous message queuing-based technique to DCOM, which is currently based on a synchronous remote procedure call technique that involves issuing requests and waiting for answers to be returned.

Falcon is also expected to use Microsoft's emerging OLE Transaction Service. This is the same service that will be used by Microsoft's SQL Server database and Viper transaction processing monitor.

“Microsoft will have the same transaction manager running across three different middleware products,” Schulte said. “This will make the message-oriented middleware part of an underlying, integrated middleware infrastructure rather than an add-on product.”

But a plan is a long way from a product. Schulte and others say there is a good chance Falcon will be delayed into 1999.

Stiff competition

Even if Microsoft delivers a strong middleware product, the company will have its work cut out for it since the market is already inhabited by the likes of IBM and Digital Equipment Corp.

These two companies have risen to the top amid an industry shakeout among some of the market's smaller players. The consolidation included Covia Technologies, Inc. withdrawing from the market last fall; Horizon Strategies, Inc. merging with Momentum Software Corp.; and Sybase, Inc. buying a small messaging vendor to extend its growing middleware line.

“This is a classic market shakeout,” Schulte said. “The pioneers who innovated and brought products to market are being swallowed up by companies with stronger financials and marketing positions.”

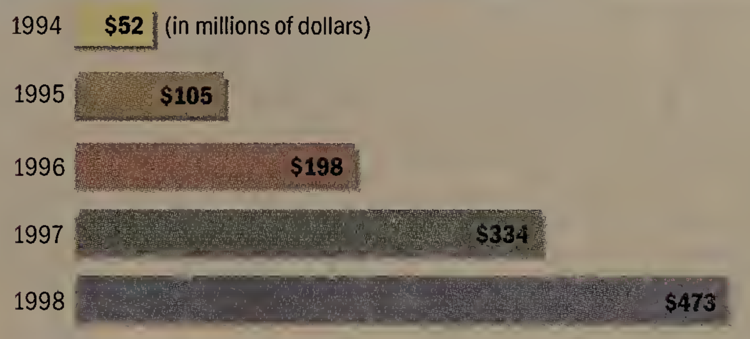
The strongest, by far, is considered to be IBM. Its MQ Series product now has the lion's share of the middleware market.

“Over the last six to nine months, IBM has made a full-court press for messaging,” said Rich Evans, vice president of enterprise data center strategies at META Group., Inc., a Stamford, Conn., consultancy. “They've finally got some fairly high transaction solutions that work and can be compared with transaction processing monitors.”

IBM has been extending MQ Series to support an array of key desktop clients, most recently Lotus Development Corp.'s Notes. With the Lotus Link option, developers can link host data with Notes-based applications and workflow.

Poised for growth

Total revenues for message-oriented middleware.



SOURCE: STANDISH GROUP INTERNATIONAL, DENNIS, MASS.

“IBM is making a big effort to provide interoperability across every platform,” said Susan Eustis, president of WinterGreen Research, Inc., a Lexington, Mass., market research company that recently published a messaging market study based on interviews with MIS managers. “[Interoperability is] what the market will go for.”

Digital's DECmessageQ is another likely survivor. The 5-year-old product is considered solid by most users. Digital released Version 3.2 in April, which boasts higher performance, MVS mainframe support and an interface to MQ Series.

“DEC understands distributed computing,” Eustis said. “DECmessageQ is a strong contender.”

Good products, vendors needed

The industry shakeout, resulting in a set of mature products in the hands of a smaller group of stronger vendors, is happening at a critical time. More MIS managers are becoming aware of messaging's benefits as they explore ways to support growing client/server applications.

“What's driving the market are the MIS groups,” Eustis said. “They have to hook their mainframes to their distributed [client/server] environments. And they have to interconnect the distributed systems.

Messaging middleware brings an array of mainframe-like features for protecting data integrity to the client/server market.

“You don't want your data just sent out to customers and business partners under E-mail,” she said. “You need features that mimic the aura of the mainframe, like queueing and the ability to deliver information once and only once.” ■

Middleware upgrades debut

Momentum Software Corp. and Talarian Corp. last week separately announced enhancements to their message-oriented middleware offerings.

Momentum, based in Englewood, N.J., rolled out Queue-Burst, an add-on to its X IPC middleware that provides faster connections between applications.

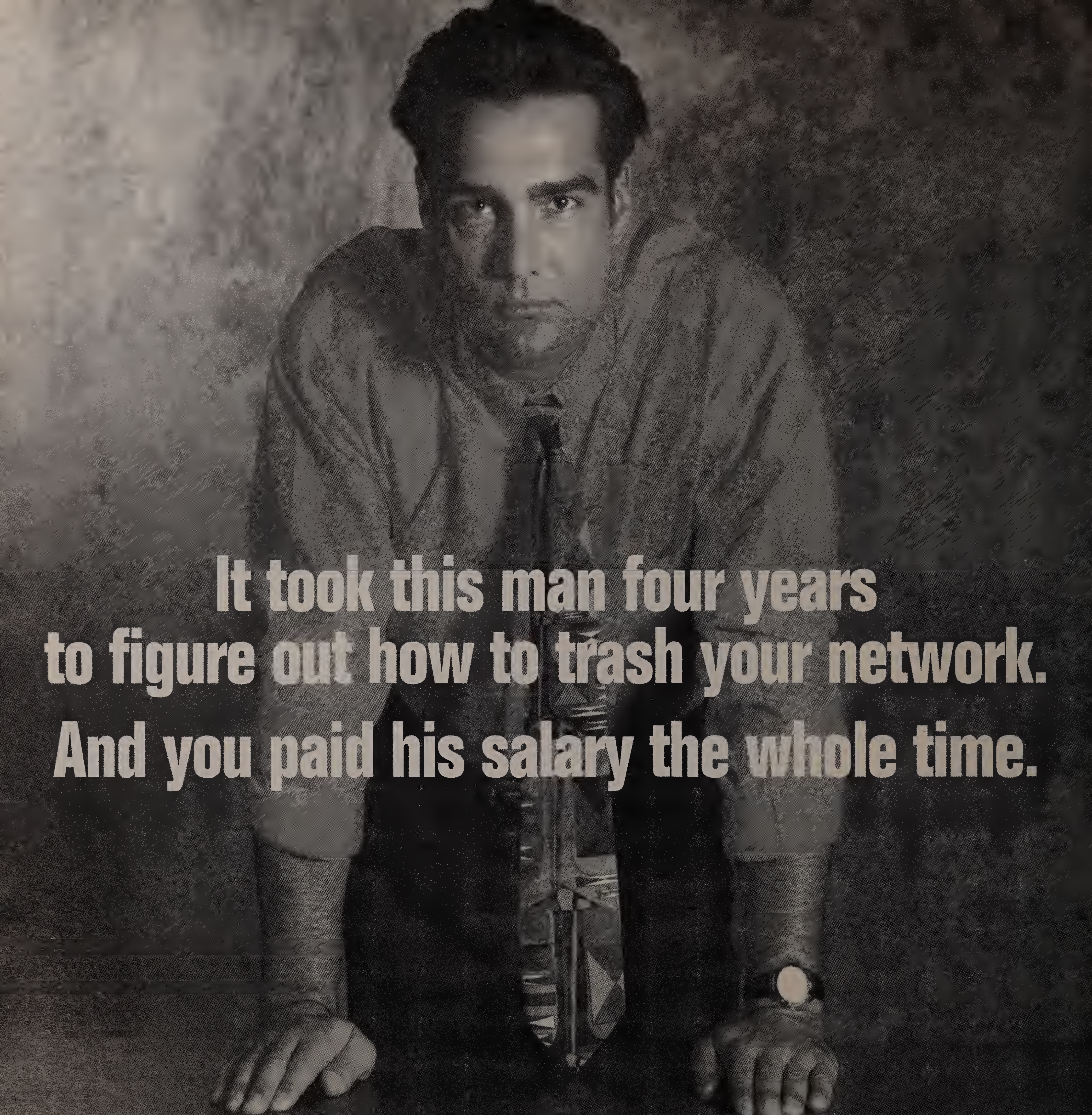
Queue-Burst uses a “read-ahead” algorithm that anticipates requests for data and starts moving data between applications before it is even requested. Administrators may define the amount of packets that are cached at a receiving application.

Talarian, based in Mountain View, Calif., took the wraps off SmartSockets 4.0, a more scalable version of its middleware that exploits a hierarchical namespace and can route messages dynamically. It eliminates the need to predefine routes between clients and servers, enabling applications to be routed along the best available path at any point in time.

SmartSockets 4.0 also includes improved security. In addition to encrypting messages, it can now enforce authentication of applications and users. The product also includes an open interface that lets users support more network protocols. Queue-Burst is free with Momentum's X IPC middleware and is available now. SmartSockets 4.0 costs $16,000 for a developer's seat and 20 connections.

Contact Momentum at (201) 871-0077 and Talarian at (415) 965-8050.

—Barb Cole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Briefs

■ **Coast Software, Inc.** *has started shipping Coast WebMaster, a $349* **Web site management tool** *that can be used to identify and repair broken links, as well as to provide performance reports and statistics. It runs on Windows 95 and Windows NT.*

Coast Software: (613) 567-3201.

■ *In an effort dubbed Project Bedrock,* **Sun Microsystems, Inc.** *and* **Network Imaging Corp. (NIC)** *said they have integrated Sun's SunScreen encryption and authentication* **firewall** *technology into NIC's 1View and WebMOM storage, retrieval and management system. This technology allows corporations to share multimedia information on a secured basis. Lockheed Martin Information Systems and Technology will act as a systems integrator for companies using Project Bedrock.*

■ *Four* **Australian banks** *— the Australia and New Zealand Banking Group, the Commonwealth Bank of Australia, the National Australia Bank and the Westpac Banking Corp. — have formed a joint venture called Mondex Australia to bring the* **Mondex electronic cash smartcard** *to Australia.*

■ **Tumbleweed Software Corp.** *has released a new version of its* **portable file format** *software, Envoy Plug-In for Netscape Communications Corp.'s Navigator. With its added support for Netscape's LiveConnect architecture, the updated plug-in can work seamlessly with Java applets. Tumbleweed is also in beta with a plug-in for the Microsoft Explorer browser with ActiveX technology. The product is available for free at http://www.twcorp.com.*

Scripting languages go toe-to-toe

Microsoft and Netscape vie to get application software vendors on their side.

By Ellen Messmer
and Carol Sliwa

The next battle in the Microsoft/Netscape war for the World-Wide Web could be over scripting languages, namely Visual Basic for Applications vs. JavaScript.

Scripting languages give developers a way to extend, link and customize applications. But developers say there are too many scripting languages for too many applications, forcing them to constantly learn new ones.

Rational Software's
Booch

Not surprisingly, Microsoft and Netscape are now out to snare the corporate software developer by getting the big application developers to support their respective scripting languages in end-user products, including 'Net-enabled tools.

So far, progress has been slow. Currently, Visual Basic for Applications, which includes Visual Basic Script, resides in only a handful of Microsoft applications, including Excel and Project. But just last month, Microsoft began licensing its Visual Basic Application Edition 5.0 with Internet ActiveX controls to software developers to embed in applications. This scheme would turn these packages into customizable development platforms for anyone accustomed to Visual Basic.

Eight companies, including Adobe Systems, Inc., NetManage, Inc. and SAP AG, said they have licensed the Visual Basic Application Edition.

Netscape is seeking to garner the same industry support for its scripting language. In fact, the company is now poised to announce licensees for its JavaScript, sources said.

But unlike Microsoft, Netscape does not intend to charge for embedding JavaScript in end-user applications, sources said. Netscape already includes JavaScript in its Navigator browser and LiveConnect tool kit. JavaScript is generally used for creating Java-enabled HTML pages.

Can JavaScript and Visual Basic go head-to-head? Some developers wonder.

"There is a need for a scripting language across applications, and right now, Microsoft and Netscape are forging a way to do that," said Grady Booch, chief scientist at Santa Clara, Calif.-based programming toolkit maker Rational Software, Inc. "But for Netscape, the two challenges are how do they break what they're facing in the Visual Basic juggernaut and how do they make money if it's free."

Programmers are unduly burdened with having to learn different scripting languages, and there is a need for a general-purpose, cross-application scripting standard, said Philip Meese, a developer at New York-based Mercury Technologies, Inc., which has been writing Java code for financial institutions.

Either Visual Basic or JavaScript could potentially become the lingua franca of scripting — though JavaScript seems more clearly in line with the cross-platform nature of Java, Meese said. However, the way that application vendors cast their votes will count for a lot, he added.

Some vendors are interested in JavaScript.

"As far as Oracle is concerned, the theme is open, open, open," said Milton Howard, senior marketing manager at Oracle Corp. "And JavaScript fits that description."

JavaScript is popular for Web sites, said David Smith, director of Internet strategy at Gartner Group, Inc. But in its current form, JavaScript is not as easy to use as Visual Basic, Smith said, and, therefore, may find it tough to win over MIS departments. He added that JavaScript also seems to produce some very slow pages on the Web. ■

Network World Fusion

Download papers about and examples of JavaScript and Visual Basic for Applications from Network World Fusion (http://www.nwfusion.com). Select News+ then Intranets & the 'Net.

Active Software blends legacy applications with Web

By Doug Barney
Mountain View, Calif.

When it comes to the Internet, Sun Microsystems, Inc. is one of the hottest games in town. But Jim Green and Rafael Bracho were bitten by the start-up bug and left the powerhouse to start Active Software, a small company that aims to put a browser face on corporate data.

As part of that effort, Active last week announced ActiveWeb, a $4,995 development system that includes a Java-enabled fourth-generation language for Web programming, links to back-end databases and a message-queuing system that feeds information to multiple servers.

The core of the product is Active Information Broker, which mediates the flow of data between information sources and the resources that consume that information.

The broker works with ActiveWeb adapters, which translate the native information formats to the broker's common format. The first round of adapters will focus on SQL-based databases, such as those from Oracle Corp., Sybase, Inc. and Informix Software, Inc. Other adapters are planned for COBOL, C and Smalltalk-based applications.

The Solaris or NT-based Information Broker server software then ensures that information from browers or back-end databases is sent to all appropriate devices.

The development environment includes Visual Java, a browser-based graphical user interface (GUI) builder, and Query Editor for accessing databases. ActiveWeb will ship this summer.

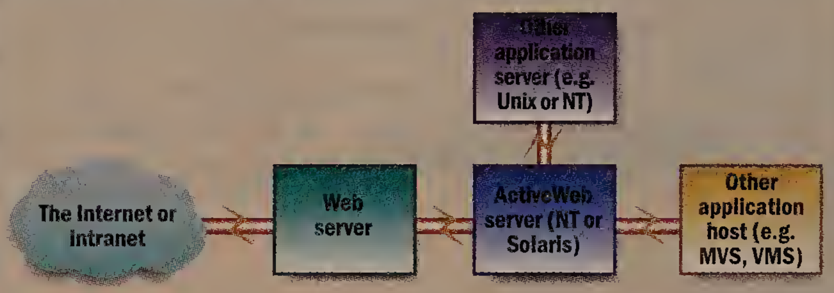
Active hopes the combination of a GUI builder, data translation technology and communications middleware will win customers over. "Our purpose in life is to extend existing applications out to the Web," said Stephen MacDonald, president and chief executive officer of Active.

Active could be mining a hot area. According to International Data Corp. in Framingham, Mass., nearly half of all companies hope to build Internet-based database applications by the end of next year.

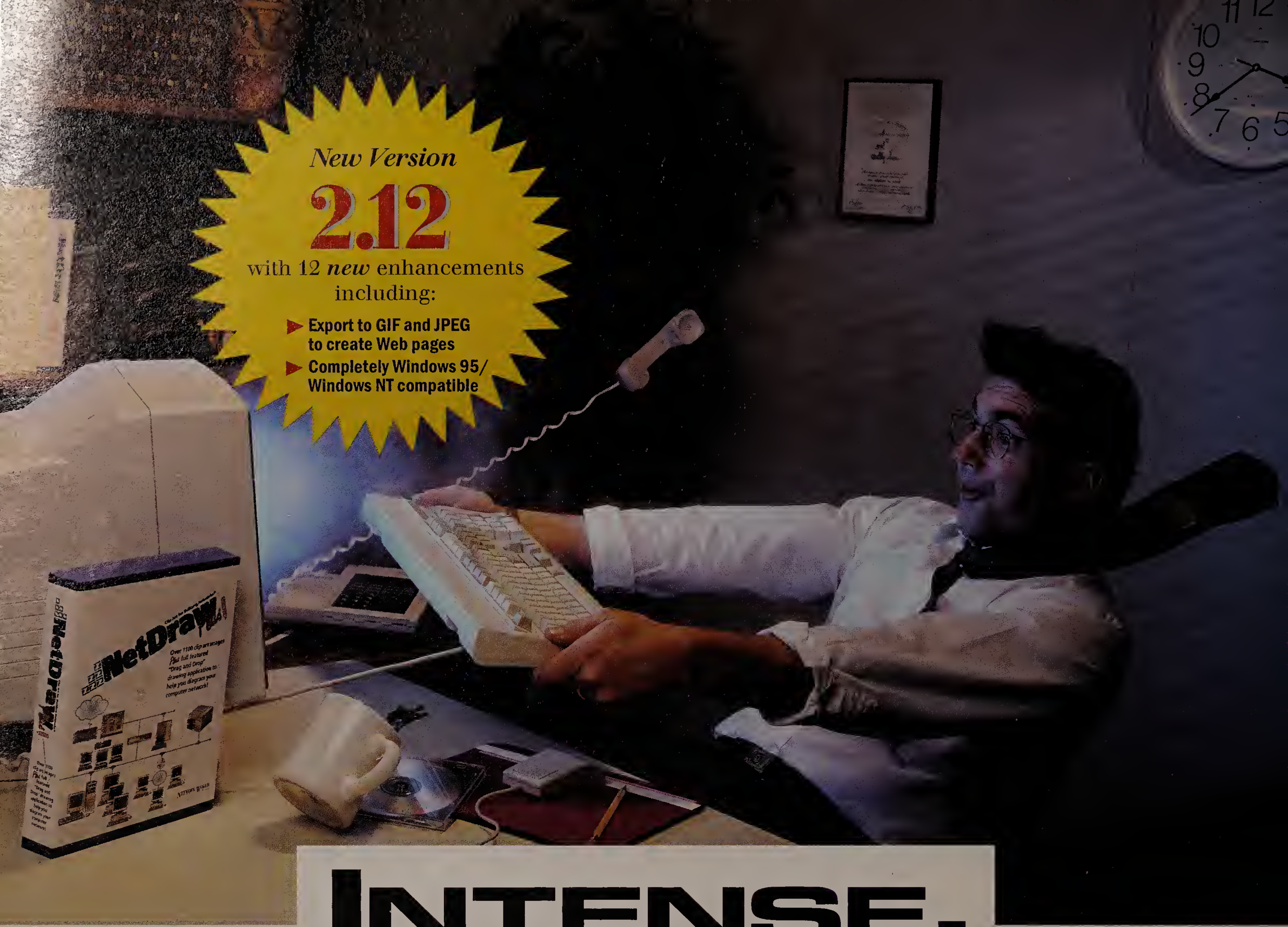
Active maintains this writing has long been on the wall. "The frequent contact [companies have] with customers is through the Web browser," according to Jim Green, chairman and cofounder of Active. Green was manager of Sun's distributed objects program. Green's partner, Bracho, was a lead architect at Sun. ■

Active Software builds legacy/Web bridges

ActiveWeb servers draw data from structured databases, translate it into Web-readable formats and distribute it to end users.


Other application server (e.g. Unix or NT)
The Internet or intranet
Web server
ActiveWeb server (NT or Solaris)
Other application host (e.g. MVS, VMS)

SOURCE: IDC, FRAMINGHAM, MASS.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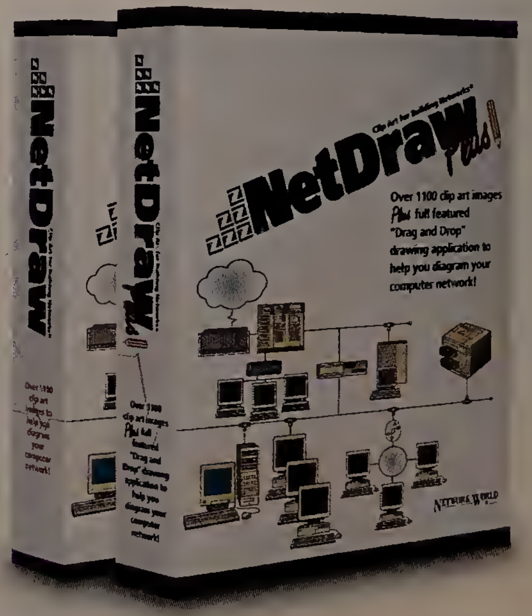

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Technology Update

Keeping Up with Network Technologies and Standards

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Be helpful

While you're in the Help Desk conference on Network World Fusion, come to the aid of your peers. In Topic 60, someone is looking for guidance on how to deal with a Microsoft Word macro.

The user has discovered that if you use the File/Close command in a Word Basic macro (Word for Windows 6) to close the document that stores the macro you are running, the file gets locked.

In other words, the NetWare operating system considers the file still held by the user; other users cannot save the file until the original user exits Windows. Also, if about 20 users do this to the same file, it gets locked completely — no other users can open it.

The user is looking for solutions, short of never closing the file that stores the macro. If you have one, go to the Help Desk conference and share your idea.

Request for more information

Another user, who works at a hospital, is in the process of conducting a vendor search and request for proposal (RFP) development for an enterprisewide electronic mail and scheduling package to run on a corporate backbone.

She is looking for resources containing sample RFPs and any other contacts on application of E-mail and scheduling systems in health care facilities.

In a recent issue, we ran a Management Strategies article on developing an RFP for enterprise electronic mail backbones (*NW*, June 3, page 53).

In the piece, Joel Snyder, a senior partner at Opus One in Tucson, Ariz., says you need to structure your RFP so you get the answers to questions concerning the product's scalability, reliability, flexibility and manageability characteristics. But the article does not provide an example proposal.

If you have any references for this user, send an E-mail to cnerney @nww.com.

Knowing UTP wiring basics can boost local net performance

The EIA-568-A standard for building wiring recognizes three catagories of UTP cabling.

By William Stallings

Fast LAN technologies may be all the rage right now, but 100M bit/sec data transmissions would go nowhere without the proper wiring.

Most office buildings are prewired with a type of 100-ohm twisted-pair cable commonly referred to as voice-grade. Because voice-grade twisted pair is already installed, it is an attractive alternative for use as a LAN medium. Unfortunately, the data rates and distances achievable with voice-grade twisted pair are limited.

In 1991, the Electronic Industries Association published standard EIA-568, which specifies the use of voice-grade unshielded twisted pair (UTP) as well as shielded twisted pair (STP) for in-building data applications. At that time, the specification was felt to be adequate for the range of frequencies and data rates — from 1M to 16M bit/sec — found in office environments.

But as users migrate to higher performance workstations and applications, interest grows in providing LANs that can operate at speeds up to 100M bit/sec over inexpensive cable. The EIA responded in 1995 by issuing a new standard that reflects advances in cable and connector design and test methods.

The new standard, called EIA-568-A, covers 150-ohm STP and 100-ohm UTP. It recognizes three categories of UTP cabling: Category 3, 4 and 5 for UTP cables and associated connecting hardware for which transmission characteristics are specified at up to 16-, 20- and 100-MHz.

Of these, Category 3 and Category 5 cable have received the most attention for LAN applications. Category 3 corresponds to the voice-grade cable found in abundance in most office buildings. Over limited distances and with proper design, data rates of up to 16M bit/sec can be achieved.

Category 5, a data-grade cable, is increasingly being installed in new office buildings. Over limited distances and with proper design, data rates of up to 100M bit/sec can be achieved.

A key difference between Category 3 and Category 5 cable is the number of twists per unit distance. Category 5 is much more tightly twisted: It typically has three to four twists per inch compared to three to four twists per foot for Category 3. The tighter twisting makes Category 5 more expensive than Category 3 cable, but provides much better performance.

UP CLOSE

Going the distance with LAN media

For better LAN performance, follow the recommended maximum distances for these media.

Media type	Maximum recommended distance
Category 3 UTP with data transmission at speeds up to 16M bit/sec	90 meters
Category 5 UTP supporting data transmission at speeds up to 100M bit/sec	90 meters
STP supporting data transmission at speeds up to 300M bit/sec	90 meters
UTP for voice transmission	800 meters
62.5 μm optical fiber	2,000 meters
Single-mode optical fiber	3,000 meters

EIA-568-A specifies the expected performance of Category 3 and 5 UTP, as well as the more expensive STP cable. The first parameter used for comparison — attenuation — is fairly straightforward. The strength of a signal falls off with distance over any transmission medium.

For copper wire media, attenuation is generally logarithmic so it is typically expressed as a constant number of decibels per unit distance. Attenuation introduces three considerations for the designer. First, a received signal must have sufficient magnitude so that the electronic circuitry in the receiver can detect and interpret the signal. Second, the signal must maintain a level sufficiently higher than noise if it is to be received without error. Third, attenuation is an increasing function of frequency.

Get more information about LAN cabling on Network World Fusion, including links to:

- An Anixter, Inc. guide to the EIA-568-A standard
- A cabling FAQ
- A cabling forum run by Teldor Wires & Cables, Ltd.

Select NetRef, Technology Resources then LANs/NOSes.

http://www.nwfusion.com

The second parameter is near-end crosstalk, which, as it applies to twisted-pair wiring systems, is the coupling of the signal from one pair of conductors to another pair. These conductors may be the metal pins in a connector or wire pairs in a cable. The near end refers to coupling that takes place when the transmit signal entering the link couples back to the receive conductor pair at that same end of the link; in other words, the near-transmitted signal is picked up by the near-receive pair.

As might be expected, Category 5 is superior to Category 3 in these two performance parameters, and STP bests both. (See the accompanying table for the recommended maximum distances for the use of these media at given frequencies.)

The EIA-568 standards have been important to the development of high-speed LAN standards. The EIA-568 media are referenced in three 100M bit/sec LAN standards: Fast Ethernet, 100VG-AnyLAN and Copper Distributed Data Interface (CDDI).

The Fast Ethernet specification, 100Base-T, allows the use of Category 5 links consisting of two twisted pair. 100Base-T also allows Category 3, but in this case four twisted pair are required, with each pair only carrying 25M bit/sec. Similarly, 100VG-AnyLAN can be implemented with Category 3 or Category 5 twisted pair.

CDDI, which is the copper version of FDDI, allows the use of Category 5 UTP.

EIA-568 also provides recommended wiring installation practices for use of STP and UTP in building wiring. The standard is referred to as a structured cabling system, and it defines a generic wiring scheme that can be used in any office building.

A structural cabling strategy is based on the use of a hierarchical, star-wired cable layout. External cables, from the local telephone company and from wide-area networks, terminate in an equipment room that is generally on the ground floor or a basement level. Patch panels and cross-connect equipment in that room connect the external cables to internal distribution cables.

EIA-568-A is both a response to the needs for LAN systems and a spur to the development of high-speed LAN products. With this standard as a base, the era of 100M bit/sec LANs has arrived.

Stallings is an independent consultant and author of numerous networking books. His latest is Local and Metropolitan Area Networks, Fifth Edition, *published by Prentice Hall. He can be reached at ws@shore.net.*

Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww. com.

EDITORIAL INSIGHTS

Learning to hate E-mail

I'm weakened by the summer heat and I can only hope you'll forgive me for tackling a subject of less-than-heroic scale.

My gripe: E-mail. Specifically, how I'm starting to hate this so-called "productivity" tool. At the risk of sounding like I've got the prickly heat, here's why:

■ Sheer volume. Managing E-mail takes up a bigger chunk of time each day, and many messages involve things the E-mailer ought to be doing for him or herself. E-mail's a guiltfree way to pawn off chores without having to endure the baleful stares you'd get asking in person. Could you find me this? Could you send me that? Sure, I've got nothing else to do. (OK, I do it too.)

■ E-mail as blow-off. Can't make the deadline? Muffed that assignment? Drop 'em a message! E-mail has joined the fax and voice mail as tools for responsibility avoidance. (Admit it, you call people during lunch hour hoping they're not around.) When it all goes south, just E-mail the bad news. "Call me if you have any questions!" Sure. But you won't be around.

■ Annoyingly constructed messages. What's more fun than pulling up a message with a gigantic header field filled with other addresses? Just keep paging down to find the inconsequential news. One recent missive started with three screens of addresses (145 to be exact) leading to the news that, in essence, the company had some news it was going to release later. Thanks!

But that message was a piker compared to a release from Barrier Island Realty with 378 addresses up high and another 181 at the tail for a grand total of 559 addresses. Quite a routing list for a 5-paragraph release about a free vacation on the Outer Banks of North Carolina. (This is the equivalent of, say, a 1,300-square inch piece of direct mail coming to your house with every address in your town on it.) And I got 13 copies of the message. Well, at least it had a subject line and it didn't contain any . . .

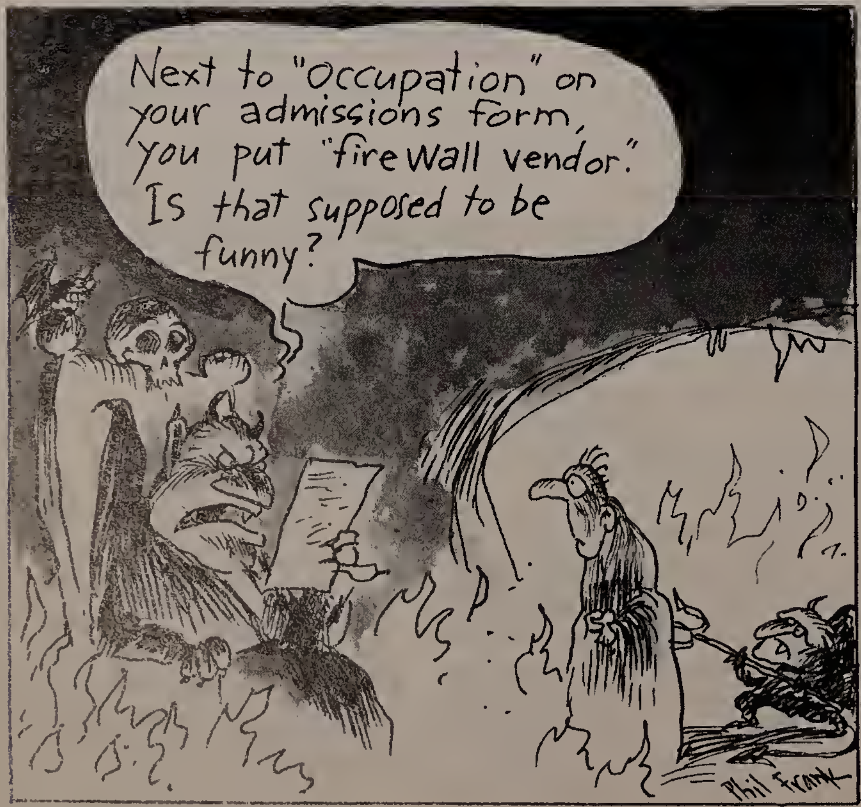
■ Attachments that launch other applications. Golly, there's nothing better than unwittingly clicking on an attachment and having it launch Netscape or Word or some other application. I know this is my own fault, but it doesn't make things any better.

This is just the tip of my E-mail frustration iceberg and I know I'm not alone. What drives you crazy? And how do we clean up E-mail?

John Gallant, editor in chief jgallant@nww.com

Teletoons

By Phil Frank and Joe Troise
baba@sfgate.com


Next to "Occupation" on your admissions form, you put "firewall vendor." Is that supposed to be funny?
Phil Frank

ABOVE THE CLOUD

The push for wireless Web access must come from users

Wireless data services, held back by limited transmission speeds and unfavorable pricing schemes, are not yet ready to assume full citizenship on the World-Wide Web. However, one potential technology — wireless cable modems operating in the Multichannel Multipoint Distribution Services (MMDS) band above 2 GHz — warrants close attention, even though it's just barely into the alpha-testing phase.

James Kobielus

CAI Wireless Systems, Inc. and National Digital Network, Inc. are conducting MMDS wireless cable modem trials in the Washington, D.C. area. Announced in May, these trials will support wireless Web access at data rates between 10M and 27M bit/sec on the downlink, considerably faster than any wireless modem and most terrestrial modems and ISDN services in use today. At these rates, wireless Web, television and streaming multimedia downloads will zip along breathtakingly.

If MMDS-based wireless Web access makes good on its early promise, it may become a marketplace contender toward the end of the decade — definitely not a solution for Web-driven users in 1996. One stumbling block is the fact that MMDS in the U.S. is still licensed for one-way downstream communications, owing to its traditional use for "wireless cable TV" service. The trials mentioned above use terrestrial telephone lines for narrowband upstream communications to the Internet service provider's point of presence. And they do not support user roaming — in effect, they represent a wireless local loop for multimedia traffic.

Until such time as MMDS or a comparable full-duplex, broadband, wireless data service becomes available, you'll have to keep your expectations low.

Until such time as MMDS or a comparable full-duplex, broadband, wireless data service becomes available, you'll have to keep your expectations low. You'll have to choose among today's diverse, limited wireless solutions when establishing a corporate standard.

Making the standards decision more difficult is the fact that few portable computers have expansion slots for more than one communications interface. Network managers usually equip users' portables with a single communications interface, typically a terrestrial modem, that utilizes the PC Card bus.

Everybody's looking for the ultimate versatile PC Card modem that supports wireless data rates that equal or exceed terrestrial speeds, but it's just not there. Not yet.

The first step — already implemented in several PC Card modems — is to support circuit-switched cellular data protocols and the packet-switched Cellular Digital Packet Data (CDPD) standard, as well as standard terrestrial modem protocols. This allows users to choose the best performing, most cost-effective, full-duplex communications option for each application.

The great advantage of circuit-switched, connection-oriented, full-duplex cellular modems is that they can be used with most North American cellular systems, which are based on the Advanced Mobile Phone Service (AMPS) protocol in the 800-MHz band. Circuit-switched data sessions can roam between AMPS systems, just like voice calls, and can support sustained data throughput up to 14K bit/sec using either the Enhanced Throughput Cellular (ETC) or Microcom Networking Protocol 10 (MNP10) protocol standards. Time-based cellular pricing makes circuit-switched cellular data communications best suited for large file transfers.

CDPD, by contrast, is a connectionless packet data service, compatible with AMPS, that supports sustained full-duplex throughput up to 10K bit/sec. Kilobyte-based pricing makes CDPD the preferred transport for low-speed, bursty traffic such as E-mail and credit card authorization.

However, the service is currently limited to major North American metropolitan areas, making it necessary to frequently switch over to circuit-oriented cellular data when roaming to the countryside.

Neither circuit- nor packet-switched cellular data standards are truly Web-worthy, but they're practically the only options available to the average North American cellular user.

Alternative wireless data technologies such as packet radio services and two-way paging lack the full-duplex, two-way connectivity necessary for Web access.

This side of MMDS-based wireless data, the next great hope is a metropolitan-based spread spectrum service such as Metricom, Inc.'s Ricochet, which supports raw data rates up to 100K bit/sec for full-duplex, connectionless communications. One big drawback of Ricochet is its lack of roaming between cells — it's more or less a wireless local-loop service for data.

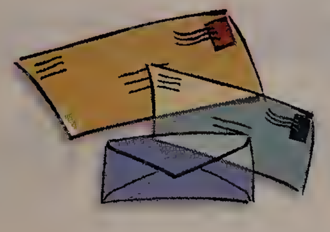
The ultimate wireless modem will probably operate across several previously distinct bands, using the best protocol for the application at hand and throttling open the throughput as necessary. However, don't expect to see this modem at a computer store near you anytime soon.

It will take at least a decade before wireless operators provide adequate public on-ramps to the Web. In the meantime, inquire about the availability of MMDS in your company's regions, and in particular about MMDS providers' plans to support wireless data services. If such plans are in the offing, consider volunteering to participate in them.

Users won't find viable wireless Web access services anytime soon unless you actively push the industry's envelope, letting vendors know how important it is for your mobile workforce.

Kobielus, a contributing editor to Network World, is a senior telecommunications analyst with LCC, L.L.C., an Arlington, Va.-based network design and engineering firm. He can be reached at (703) 807-5075 or via the Internet at kobielus_james@lccinc.com. The opinions expressed are his own.

MESSAGE



QUEUE

Timing is everything

Regarding Skip MacAskill and Melinda Le Baron's column "Bay's timing is all wrong" (June 24, page 30):

It looks like some insight into why Bay Networks, Inc. announced concurrently our new system 5000MSX platform and our intention to acquire Penril Datability Networks, Inc.'s digital signal processing processing (DSP) modem operation might prove helpful.

For starters, MacAskill and Le Baron are right — timing is everything. What service providers want right now from their suppliers is a road map for the future. This road map must ensure investment protection for what these companies are buying today. That's because the network infrastructure purchases they're making now represent a fraction of what they expect to buy over the next few years.

So, not only did Bay announce the industry's highest concentration and modular platform (System 5000MSX) for remote access, routing and switching, we also told service providers how we intend to significantly reduce their costs in the future through our acquisition of DSP modem technology.

Service providers are picking suppliers now for the long term. Our service provider customers and prospects are excited that we've articulated a strategy to lead the market in maximizing port density while lowering cost per port.

We're glad that MacAskill and Le Baron endorse the importance of both announcements. Hopefully, this answers their questions about timing.

Bruce Sachs
Executive vice president
Bay's Xylogics and Internet/Telecomm Business units
Burlington, Mass.

FDDI's not the answer

Skip MacAskill and Melinda Le Baron's column "Fast Ethernet? Not so fast" (May 27, page 32) was misleading.

Indiana University's Bloomington Campus has four production FDDI rings, and we're moving to a switched Ethernet backbone. When you're using a Fast Ethernet switch as a backbone, cutting a single building connection affects only that building, not the entire backbone. Unless your fiber is laid out in a physical ring, FDDI's dual counter-rotating scheme doesn't really help with cable cuts. Those of us who've actually diagnosed FDDI station management problems will tell you that much more backbone downtime is attributed to the complex station management required for these redundancy features than to cable cuts or hardware failures.

Point-to-point Ethernets, the type of configuration likely when using a switched backbone, can run at high utilization levels. Ethernet (fast or slow) has the same ability to accommodate a burst of traffic or sustained traffic.

Steven Wallace
Manager, network operations
Indiana University
Bloomington

MacAskill and Le Baron respond: We agree that point-to-point switched Ethernet links provide a far better sustained rate of traffic than Ethernet segments when they are shared. But unless those links are full-duplex, you can still get collisions; therefore, you do not get as predictable performance and as high a sustained rate of traffic without errors as with an FDDI ring.

On the right track

In your editorial "Train in vain" (June 3, page 36), I agree with most of your assessment of the lack of training in most companies. I also note that you seem to miss an important category of personnel: lower level employees with a good grasp of computers and applications who are held down by computer-illiterate bosses.

Most bosses are afraid of workers with PC skills that can make them look bad, especially lower level people. Until management can understand what is necessary to motivate computer-literate lower level workers, a great talent pool will go to waste.

David Govan
Tool inspector
Sikorsky Aircraft Corp.
West Haven, Conn.

Regarding your editorial "Train in vain":

My company uses a local college for Windows 95 training, and a few users participate in application-specific training when the need arises. Our most powerful tool, however, is our weekly Lunch & Learn.

Those who have time meet in our main conference room to share their knowledge. I solicit everyone in advance for topics, gather questions and ensure that the "power users" attend. If necessary, I borrow a hub from our test lab and let the mobile users plug in to the network. Together, we learn how to use powerful Excel functions, drop a spreadsheet into a Word document, build a multilayered Visio network diagram and so on.

We have a long way to go before a majority of us are comfortable with the new tools. However, if we can trigger process improvement ideas, the time and money that we'll save will dwarf the bucks the company spends for pizza once a week.

Ray Starbird
IS manager
AvData Systems, Inc.
Atlanta

A better name

Upon reading your correction of the date for the Certified Novell Engineer recertification registration (June 3, page 8), I couldn't help but wonder when "Novell University" became an accredited engineering school, and where it ranks among the engineering schools when these rankings are published.

CNE should be renamed Certified Novell Expert. Too often the term is misconstrued or misrepresented as Certified Network Engineer. There is no engineering accreditation for that label, either.

Jim Walton
Electronics engineer
U.S. Army Information Systems Command
Fort Belvoir, Va.

IntraNet feedback

I'm very happy *Network World* has started *IntraNet Magazine* (June 10). My company is starting to set up an intranet, and I need specific information to build a good business argument in favor of devoting more money and resources to it. Senior management is curious, but skeptical.

Will your publication have any articles that will lay out how to convince upper management it's worth it to build a corporate intranet?

David Estrada
Systems admininistrator
Lee Hecht Harrison
New York

Editor's response: Look for "Hawking intranets: 10 tips for refining your intranet plan and perfecting your pitch to the top brass" in the next issue of IntraNet Magazine, *which will appear July 15.*

Congratulations on the successful launch of *IntraNet Magazine.* The premiere issue was chock-full of useful information. Unfortunately, I found *IntraNet Magazine* — like its parent magazine — to be free of substantive MacOS-related content. In fact, *IntraNet Magazine* appeared to be completely free of references to Macintosh.

Many network administrators and system managers have found the Macintosh to be not just a low-maintenance and powerful user workstation, but an extremely flexible, reliable and low-cost means of transporting Internet and intranet data. It's a system that deserves more coverage in a publication like *Intranet Magazine.*

Peter Cohen
Systems admininistrator
Addison Wesley Interactive
Reading, Mass.

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Standards is
all over the ca

ATM: sh

One thing is certain about ATM: It's been over-hyped since the beginning.

First there were positive messages: Asynchronous Transfer Mode will let you build a seamless LAN/WAN enterprise network that will handle data, voice, video — you name it. And the ATM Forum will ensure compatibility among vendors, so you'll have freedom of choice.

Clearly, it hasn't quite worked out that way, and lately there's been hype of a negative nature: ATM is dead in the local area.

The reports of ATM's death are greatly exaggerated, of course, but its prognosis is less than clear. Debates over critical standards rage openly at the ATM Forum. News reports threaten obsolescence for currently installed switches. Rather than experimenting with ATM, many users are opting for frame relay or Fast Ethernet.

Questions abound. What's the holdup at the ATM Forum? When will key standards be complete? And when will they be useful? Will ATM eventually rule networking or drift into niche status? Is it safe to invest in ATM today, or should you wait?

Great expectations

Let's start with the ATM Forum. Perhaps its biggest mistake has been to promote itself too successfully. Users' hopes were raised so high, they had no place to go but down. Technologies of similar scope, such as TCP/IP, took decades to develop. Maybe the ATM Forum should

ATM
From LAN to WAN

sues rage and there's heated competition
npus, but its fate in the wide-area seems secure.

aken but still standing

By Bob Bellman

have billed itself as a research project, like the early Internet Engineering Task Force (IETF), to set more realistic expectations.

In reality, the ATM Forum has been incredibly productive. As of May, 62 specifications had been completed, including User-Network Interfaces (UNI) defining how devices connect to ATM networks at various speeds, LAN Emulation (LANE), circuit emulation, basic interswitch signaling, API semantics and testing guidelines. Another 34 specifications, including those listed in Table 1 on page 34, are in the works.

The Anchorage Accord

But productivity has its drawbacks. New specifications are being spewed out so rapidly that users can't tell what works with what. Does Traffic Management 4.0 require Signaling 4.0 or will it work with UNI 3.1? Even worse, there have been no guarantees of backward-compatibility. Due to incompatible signaling protocols, a device that supports UNI 3.1 cannot complete a call to one that's using UNI 3.0.

The Anchorage Accord, approved at the April meeting of the ATM Forum Technical Committee, offers a remedy. The accord identifies foundation specifications needed for a stable ATM infrastructure, plus application and service specifications for multiservice networking.

''UNI 3.1 is the current foundation,'' explains George Dobrowski of Bellcore, chairman of the Technical Committee. ''In one document, you get everything you need. But it is no longer practical to keep everything in one document. The Anchorage Accord is a packaging of the specs to put them in perspective.

"The accord also implies new criteria for our decision- making process,'' he said. ''Foundation specifications will be revised only to correct interoperability problems.''

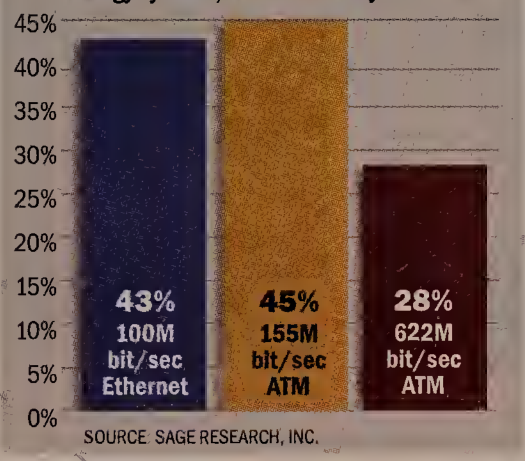
For one thing, new versions must now be compatible with their predecessors. Revisions are already planned, because as Dobrowski points out, ''Not all the specs are at the same parity level yet.''

For example, Broadband Inter-Carrier Interconnect 2.0, which standardizes the interface between public networks, supports UNI 3.1, so it must be brought up to the 4.0 level.

Specifications at the 4.0 level are relatively new, so compliant products won't stabilize until early 1997. Meanwhile, prudent users can base their ATM networks on UNI 3.1, LANE 1.0 and Circuit Emulation Services. Although not as flexible as the 4.0 family, this basic set delivers dependable fat pipes and high-performance LAN backbones. Beyond the 3.1 level lurks untested algorithms and potential incompatibilities.

The LAN landscape of the future

Percentage of respondents planning to add each technology by 1999, based on survey of 175 users.



SOURCE: SAGE RESEARCH, INC.

Dueling standards

In the latest issue of ''53 Bytes,'' the ATM Forum newsletter, Dobrowski states that the forum undertakes ''new original work where standards or other industry organizations have no effort under way.'' But by boldly going where no standards body has gone before, the forum may wind up out on a limb.

The Multiprotocol over ATM (MPOA) specification is a prime example. MPOA specifies a standard approach for carrying protocols such as IP and IPX over ATM backbones. Unlike conventional routers, which both calculate routes and forward packets, in the MPOA approach packet forwarding is handled by switches at the edge of the network while route calculation resides in a separate server. Special protocols keep switches and the route server in sync.

George Swallow, principal engineer at Cisco Systems, Inc. and chair of the MPOA working group, extols MPOA for providing the ''integration of intelligent virtual LANs, cost-effective edge devices and an evolutionary path from LAN Emulation.''

Bob Klessig, director of systems marketing at 3Com Corp., concedes that ''MPOA provides shortcut routing across subnets and an efficiency benefit over LAN Emulation.'' But he questions the separation of routing functions. ''It's not obvious what the benefit is.''

By centralizing route calculation, MPOA is meant to simplify edge devices. But Klessig remains skeptical. ''Ordinary routing protocols are not all that complicated compared to MPOA,'' he says. In their Network Interoperability Alliance announcement, 3Com, Bay Networks, Inc., and IBM ignore MPOA — in sharp contrast to Cisco. Instead, they promote Integrated PNNI as "a single routing protocol for both ATM and existing internetworking layer protocols like IP.''

Ipsilon Networks, Inc. offers a third approach. Ipsilon augments each ATM switch with IP routing intelligence. Simple electronic mail messages and other short-lived flows visit each router. Long-duration flows, such as Web image downloads, cut through on ATM virtual circuits (see Figure 1).

Simpler than MPOA, the Ipsilon architecture exploits ATM performance while maintaining compatibility with existing IP equipment and applications. Ipsilon publishes its protocols as IETF requests for comments (RFC).

What all this means is you will inherit an architecture for routing over ATM when you select a vendor, or vice versa.

Compatibility between major vendors will be limited — a far cry from the early promises.

ABR unknowns

Another type of ATM service that has been the subject of controversy, even though it has been approved as part of Traffic Management 4.0, is available bit rate (ABR). ABR was designed for bursty LAN-to-LAN traffic. Rather than allocating peak resources in advance, ABR reserves minimal bandwidth and lets applications grab more on demand. Flow control ensures that each virtual circuit gets its fair share.

ABR has two ways to throttle an overactive input device (see Figure 2). In the simpler approach, the Explicit Forward Congestion Indicator (EFCI) in each cell header is used to mark offending flows. When a destination device sees an EFCI flag, it sends a message back to the source. The source is told to slow down, but not by how much, so it may take two or three feedback cycles to clear congestion.

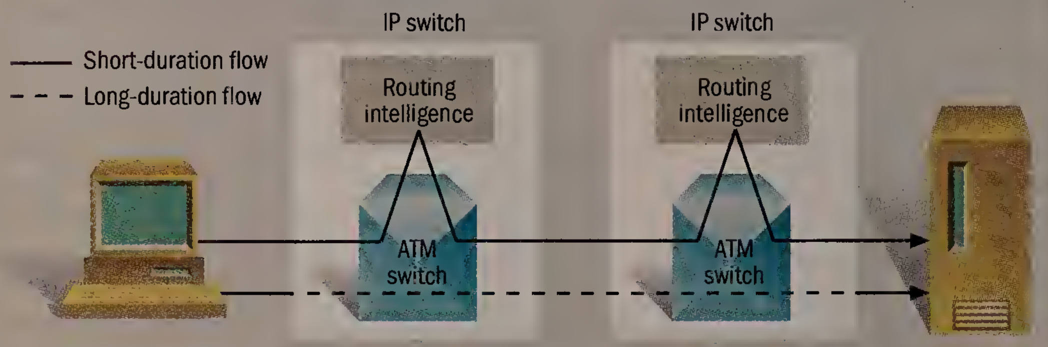
Alternatively, a network node can send an Explicit Rate (ER) message directly to the source, telling it how much to slow down. The ER method relieves congestion more rapidly than EFCI because the feedback loop is shorter and the source slows to the desired rate all at once.

But to keep up with broadband speeds, ER calculations must run in silicon. Some new switches, such as the Collage 740 Backbone ATM switch from Madge Networks, Inc., already support ER. Others require hardware upgrades. Moreover, the ABR specification does not explain how to calculate an ER, so different vendors use different algorithms. Until an Explicit Rate ABR is built and tested in multivendor networks, no one can say how well it will work.

"Public carriers are interested in ABR because it lets them overbook bandwidth and reduce costs," says Keith Mumford, ATM product manager at General DataComm, Inc. "But they don't know whether ABR will be a viable solution." Ed Briones, product manager for Pacific Bell's FasTrak ATM Cell Relay Service, agrees. "We will offer constant bit rate and variable bit rate at first. We're looking at offering ABR, but have no firm plans yet."

EFCI should be sufficient for many local-area applications. Joe Skorupa, director of marketing for switches and internetworking at Fore Systems, Inc., offers this advice: "EFCI is OK where the control loop is short — up to three switch hops and up to half a kilometer. You need an explicit rate where the control loop is longer." And a hardware upgrade may not be needed with EFCI. "Fore has been supporting EFCI for two years," Skorupa boasts, "since the introduction of the ASX-200 family."

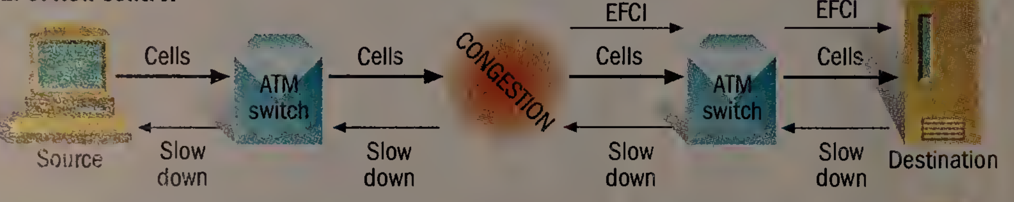
FIGURE 1: Ipsilon's plan for routing over ATM



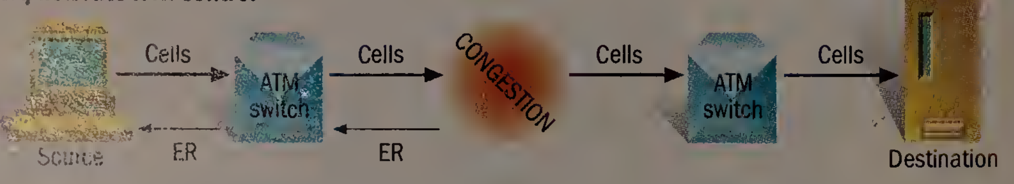
Ipsilon outfits its ATM switches with routing intelligence that ships short-duration flows, such as E-mail messages, through each router; longer flows cut through the switch on ATM virtual circuits. Thus, the switch can exploit ATM performance features while maintaining IP compatibility.

FIGURE 2: Two types of ABR flow control

a. EFCI flow control



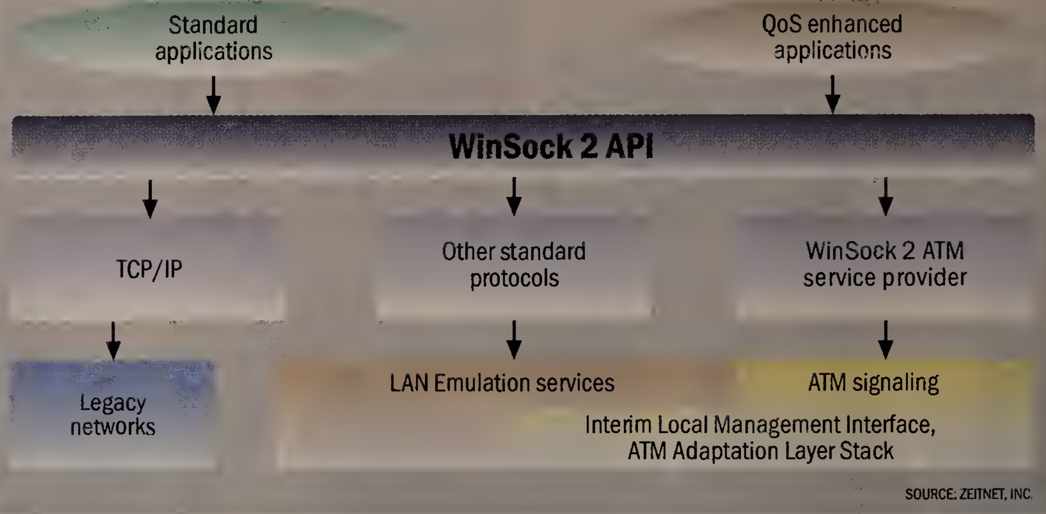
b. Explicit rate flow control



When a destination device sees ATM cells marked with Explicit Forward Congestion Indicators (EFCI), it sends a message back to the source telling it to slow down. But it doesn't say by how much, so two or three cycles may be necessary to clear congestion. With Explicit Rate (ER), however, the source node is told the rate at which it needs to throttle back, thus relieving congestion more rapidly.

FIGURE 3: WinSock 2 at your service

New Microsoft API lets Windows 95 and NT support ATM quality of service features.


Standard applications
QoS enhanced applications
WinSock 2 API
TCP/IP
Other standard protocols
WinSock 2 ATM service provider
Legacy networks
LAN Emulation services
ATM signaling
Interim Local Management Interface, ATM Adaptation Layer Stack

SOURCE: ZEITNET, INC.

ABR promises valuable benefits, but users should look before they leap. Find out whether a hardware upgrade is necessary and how extensive it will be. Get ABR working in a single-vendor environment before trying out multivendor. And make sure there's something listening to the feedback — either an up-to-date end-station or an edge device with buffers big enough to absorb large bursts.

Who cares anyway?

Of course, a larger question overshadows all the controversy: Does anyone really need ATM, or will frame relay and increasingly faster versions of Ethernet displace ATM forever?

The answer is clear in the wide area. Jonathan Reeves, chief executive officer of Sahara Networks, Inc., puts it this way: "In the era of deregulation, service providers must enter new markets or perish. At the same time, they must control their costs. Only ATM has the scalability and flexibility to let carriers reach new markets while simultaneously consolidating their infrastructures."

Pacific Bell's FasTrak ATM service illustrates Reeves' point. FasTrak supports UNI access at speeds of 1.5M to 155M bit/sec. By the first quarter of next year, FasTrak will merge with Pacific Bell's frame relay network to furnish frame relay-to-ATM interworking. And the FasTrak service boosts throughput at Internet Network Access Points (NAP) by connecting Internet service providers (ISP) at speeds up to 622M bit/sec.

As Mumford suggests, "The Internet may be the killer application for wide-area ATM." ATM-based transparent LAN services already carry traffic from end users to ISPs. ATM-based frame relay moves packets within ISP backbones. And ATM-based NAPs interconnect ISPs.

Local-area ambiguity

ATM has little long-term competition in the wide area, but its fate on the campus is less obvious. For many users, a move from Ethernet to ATM at the desktop is unacceptable.

"Changing the PC [network interface card] is a real impediment," says Tom MacDonald, director of advanced systems technology at Cable & Wireless, Inc., "even if the ATM NIC costs the same as an Ethernet NIC. The labor involved and the risk of breaking something when you open the PC are too great a hassle at any cost."

As a pilot test for the rest of the company, MacDonald recently upgraded an internal network supporting about 250 users. To hedge his bet, however, he installed WS3000 Workgroup Switches from Whitetree, Inc., which support both 10M bit/sec Ethernet and 25M bit/sec ATM over the same ports.

Indeed, despite rumors to the contrary, users are still open to ATM in the local area. A recent study by Sage Research, Inc., asked 175 users what LAN technologies they expect to add to their networks by 1999. ATM fared well in relation to 100M bit/sec Ethernet, including a surprising 28% of respondents who expect to add 622M bit/sec ATM (see graphic, page 33). Over 40% of the users expecting to add 100M bit/sec Ethernet also plan to add 155M bit/sec ATM.

Fore's Skorupa offers the following prescription: "Use full-duplex Ethernet at either 10M or 100M bit/sec to the desktop. Use ATM in the backbone. If you need constant bit rate, use ATM at 25M or 155M bit/sec to the desktop." As Skorupa implies, the deciding factor may be quality of service (QoS).

TABLE 1: ATM Forum agenda

Work In progress	Approval forecast
Broadband Inter-Carrier Interconnect (BICI) 3.0	TBD
LAN Emulation (LANE) 2.0	April 1997
Multiprotocol over ATM (MPOA) 1.0	February 1997
Inverse ATM Multiplexing	TBD
Integrated Private Network-Network Interface (I-PNNI)	TBD
Residential Broadband (RBB)	December 1996
Security 1.0	February 1997
Voice and Telephony over ATM (VTOA)	October 1996

ATM's QoS features are well known. But sophisticated traffic management is

See **ATM standards,** ***page 40***

Research lab has its share of fits and starts but remains convinced ATM is the path to the future

Argonne is all for ATM

By Elisabeth Horwitt

Argonne's *Kuhfuss, Krystosek and Curtis (clockwise from left) have had tough battles with ATM, but are confident it is the best bet for the lab's virtual reality CAVEs, group collaboration tools and other net-bulging applications.*

PHOTO BY DAVID SUTTON

If it's possible for a single organization to be a microcosm of all ATM users, representing all the problems and promise of the technology, that organization is Argonne National Laboratory.

The government-funded research facility, which is run by the University of Chicago, knows well the limitations of Asynchronous Transfer Mode, many of which have to do with interoperability. But it is nonetheless bullish on the technology, confident it is the right choice to support its myriad bandwidth-intensive applications.

Argonne began serious implementation of ATM about two years ago, following about two years' evaluation, says Tim Kuhfuss, director of Argonne's technology division. It now has ATM equipment of all shapes and sizes supporting applications ranging from the straightforward to the surreal.

On the more surreal side, ATM switches provide the networking foundation for the lab's Cave Automatic Virtual Environments (CAVE). These are multidimensional virtual reality theaters that cover the walls of 10-foot cubes with complex, interactive images — the stuff of science fiction movies.

Used to depict the inner workings of molecules, viruses and product prototypes, CAVEs harness the CPU power of multiple supercomputers, which may reside at different buildings within Argonne's campus or at supercomputing facilities distributed across the U.S.

This is where ATM comes in. Argonne, along with many of its academic and research partners, has concluded that the cell switching technology is not just the most effective, but the only viable technology to support CPU-intensive, distributed and multimedia applications. "We chose ATM primarily because we couldn't do it any other way," says Paul Krystosek, computer network engineer at Argonne's Electronics and Computing Technologies (ECT) division.

ATM implementation has been less the result of an overall policy decision by ECT or upper management than of separate Argonne groups independently determining the technology is the best bet to support upcoming projects, Krystosek says.

For instance:

■ ATM switches now link not only distributed supercomputers running CAVE applications, but user workstations that want to view and collect data from the CAVEs.

■ Argonne's Multimedia Laboratory wants to use a Newbridge Networks, Inc. Vivid Workgroup ATM switch to connect an IBM SP video server to IBM RS/6000 workstations. Clients will be linked to the ATM switch over switched Ethernet links. Users can then collaborate on projects using a combination of video, data, voice and whiteboarding. Switched Ethernet by itself "could support video pretty well, but not much else," Krystosek says.

■ The Futures Lab group wants ATM for Labspace, a funded project for designing software that Krystosek says will support multimedia collaboration among geographically distributed experts. It would also allow users "to record whole virtual reality sessions or conferences that use a combination of audio-video, whiteboarding and document sharing, and play them back," he says.

■ Argonne's Structural Biology Center is implementing a Fore Systems, Inc. ATM switch to enable users to remotely operate and collect data from Argonne's Advanced Photon Source (APS) facility, which Kuhfuss described as "the world's brightest X-ray used for scientific research."

■ A project is in the works to implement an ATM backbone for connecting traditional routers with switched Ethernet and FDDI LANs across the Argonne campus, says Jeff Curtis, Argonne internetwork manager. Such LAN installations are used primarily by "regular" or nonscientific users.

While their demands are being met now by judicious deployment of switched Ethernet, Krystosek says IT wants ATM in place before the expected surge in multimedia applications overburdens the installation.

The above projects are primarily local right now, but Argonne is in the process of extending access to such resources — via ATM — to remote users in other research and academic institutions. The laboratory already participates in two ATM-based carrier-based networks.

Metropolitan Research and Education Network (MREN), which uses Ameritech Corp. services, supports collaboration between universities and laboratories in the Chicago area. "We all connect up to Ameritech's ATM switch," Krystosek says. "Some educational groups use a router connection; we presently use a Newbridge ATM switch."

Argonne also participates in Energy Sciences Net (ESNet), an Internet subnetwork that "uses ATM quite a bit," Krystosek says. "We have an OC3 ATM connection with Lawrence Livermore" over the network.

Despite all its versatility and cutting-edge technology, Kuhfuss says, most Argonne ATM installations linger "in that gray area between prototype and production."

What is Argonne waiting for? Primarily stable, fully developed ATM industry standards that will enable its mixed bag of ATM switches to cooperate. Standards-based ATM connections are a must at Argonne, Krystosek says, given IT's inability to impose a single ATM platform across all user groups — let alone at the outside institutions with which it collaborates.

Two years ago, when Argonne user groups first began deploying ATM locally, the only sufficiently complete and stable ATM interoperability standard was permanent virtual circuit (PVC). PVCs are more or less permanent paths across an ATM backbone between specific pairs of end devices. However, the inherent limitations of PVCs have become more apparent as Argonne's ATM implementations grow in number and sophistication.

Perhaps the biggest problem is that any time the network changes, someone has to reconfigure the ATM tables that define the end-to-end pathways. While PVCs worked fine when Argonne only had one or two ATM switches, Krystosek says, the task of reconfiguring tables has grown monumental as more and more groups implement switches.

PVC tricks

In fact, Argonne has gone through several ATM iterations as the number of user workstations on the network has increased. The laboratory started out by connecting pairs of workstations using point-to-point PVCs within a single switch.

"Then we had a real stroke of genius," Krystosek says. "Instead of doing this over and over, we established a matrix of PVCs" connecting all the ports in the switch. That meant bringing new workstations onboard was a simple matter of activitating the PVC connecting the ports to which the workstations attached.

Then Argonne started adding more ATM switches, and the problem became how to efficiently direct traffic across them. IT's solution was to link each switch to a router, which can filter out locally directed traffic and direct outgoing traffic to the appropriate remote ATM switch.

Increasingly, however, Argonne projects are demanding ATM switched virtual circuits (SVC), in which ATM switches interact to set up end-to-end circuits on a dynamic, as-needed basis.

SVCs are needed to introduce advanced ATM services and features such as multicasting and quality of service. QoS supports the ability to allocate bandwidth according to the specific needs of a particular application or medium. For example, the Advanced Photon Source facility "requires a mix of QoS," Krystosek says. "You have a file server collecting data from the APS, which requires high bandwidth. And you have remote control of APS operations, which requires guaranteed bandwidth and low latency."

ATM's ability to support QoS was one main reason why it was chosen for APS over High Performance Parallel Interface (HPPI) and Fibre Channel, Krystosek says. In addition, he notes neither of the other two broadband networking technologies support WAN connections. In many Argonne projects, including CAVEs, Labspace and the multimedia lab, "we want to be able to do multimedia over a WAN, so that it doesn't matter if the client is here or across the country."

Standards wish list

Hampering Argonne's migration to more sophisticated ATM capabilities is the slow industry movement toward standards, without which multivendor SVC circuits are impractical.

This may be the year when it all comes together. Earlier this year, the ATM Forum finalized Private Network-to-Network Interface (PNNI), a key specification for setting up SVCs across ATM switches. Also recently finalized is available bit rate (ABR), an ATM network flow control scheme for allocating available rather than reserved bandwidth to different data transmissions.

"While we now have SVCs within single-vendor ATM clouds, we would very much like to move up to PNNI-based interoperability across multivendor ATM switches," Krystosek says.

However, PNNI is only one of several standards that Argonne needs to support multivendor ATM SVCs. Another is Multiprotocol Over ATM (MPOA), which the ATM Forum is expected to finalize this year. MPOA defines how ATM switches can directly handle the routing of LAN transmissions generated by TCP/IP, Novell, Inc. IPX and other popular transport protocols. It provides a standardized "way to do routing through an ATM network without having to go through [separate] conventional routers, which can create bottlenecks," Curtis says.

The Multimedia Laboratory would like to implement MPOA-based SVCs for its video server project. Newbridge currently supports an early version of MPOA, but it does not make ATM adapters for microchannel bus systems, such as the project's IBM SP video server and RS/6000 workstations. So, the lab is using ATM adapters from IBM and Fore, neither of which supports MPOA.

Furthermore, Newbridge's Vivid ATM switches speak UNI 3.1, while the other two vendors support UNI 3.0. The two versions of UNI, which specifies how end devices connect to an ATM backbone, are incompatible. The current solution: The laboratory uses both a Fore and a Newbridge ATM switch. Systems equipped with a Fore ATM adapter talk to the Fore switch over SVCs, and to the Newbridge switch using PVCs. Multivendor SVCs will have to wait until other major vendors support MPOA — hopefully soon after the standard is finalized.

Argonne is also waiting for Newbridge to support IPX routing in MPOA. Right now, it only routes TCP/IP, while bridging other common protocols.

Network management is another issue when it comes to MPOA. There is no way for MPOA-capable switches to work with routers to gather traffic statistics, Curtis says, "such as how much traffic is going in and out of certain ports, which nodes are talking to which nodes." While such gaps are of minor concern to high-end users at the supercomputing sites, he says they have put "a lot of regular production type users" off MPOA, at least for the moment. A group of vendors is working on what amounts to an ATM version of Remote Monitoring to address that problem.

ATM vendors such as Cisco Systems, Inc. have already announced plans to implement RMON traffic-monitoring agents on ATM switches, Curtis says. "That helps give us a better idea of utilization of links into a switch, but there's a lot more to managing a network — particularly when you have SVCs, virtual links, and then throw MPOA on top of that." Network managers need to be able to figure out, for example, "what users out on the ATM network are members of which virtual LANs."

Newbridge provides a graphical user interface-based platform that presents such information — for its own systems, Curtis says. Conversely, he says Hewlett-Packard Co.'s multivendor network management platform, OpenView, is "a good solution for traditional FDDI and router networks," but not necessarily for ATM.

In good company

Argonne is by no means facing these issues alone. Indeed, when Argonne and many of its research affiliates got together at a workshop a year ago, "We found that we were all going to high-speed ATM," Kuhfuss says.

Moreover, Argonne and its research partners have been exploring the potential of ATM as a vehicle for high-speed collaboration among geographically distributed research groups. In addition to stable, carrier-based regional networks such as ESNet and MREN, Argonne has been part of a number of short-term pilot projects to test ATM's capabilities as rigorously and fully as possible.

One of the more notable was Information Wide Area Year (IWAY), a prototype ATM WAN engineered and operated by a consortium of dozens of research institutions. IWAY ran for about a year, culminating in a demonstration last December at the Supercomputer '95 conference.

During IWAY's year of operation, participants used it as a testbed for ATM's viability as a medium for distributed applications ranging from environmental restoration decision support to climate simulation to CAVE virtual reality environments. The project was also designed to give ATM users and carriers an opportunity to learn and work together on some of the nitty-gritty challenges of constructing long-distance ATM connections, Krystosek says.

One such challenge is network troubleshooting. Krystosek recalls one example. "We ran into a problem with IWAY where pings were not getting through from Washington, D.C. to Monterey," he says. Network managers at both sites first

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Argonne's tips for ATM implementers

With Asynchronous Transfer Mode technology still evolving, particularly in the standards area, net staffers at Argonne National Laboratory warn that you need to think carefully before committing to a full-blown implementation. "But if you don't mind being a bit on the cutting edge and having to adapt as ATM protocols develop, you can start using ATM today," says Jeff Curtis, Argonne's internetwork manager.

Conversely, if you want plug-in technology and have applications that "demand rock-solid 7/24 service," Curtis says you should probably wait awhile before diving into ATM.

"You need to be extremely technical to tackle ATM," adds Paul Krystosek, computer network engineer at Argonne's Electronics and Computing Technologies (ECT) division. "You need at least one or two technical hotshots even to do a pilot."

For those willing to forge ahead, Argonne offers the following tips:

- **NETWORK ABOUT NETWORKING.** Through the Information Wide Area Year (IWAY) project, and as an active ATM Forum member, Argonne has formed close user and vendor ties. Such ties are crucial to stay abreast of – and push for closure on – key standards, as well as for getting a vendor involved in nitty-gritty problems like why IP is generating too much overhead on an ATM circuit.
- **DO LOTS OF PILOT TESTING** involving real applications before rolling out production ATM services. "You need to go all the way up the stack before you can figure out a good solution," says Tim Kuhfuss, director of Argonne's technology division.
- **BE READY** to do some heavy-duty reconfiguring and rearchitecting. To meet the needs of an expanding ATM user population, Argonne went through several increasingly complex permanent virtual circuit (PVC) configurations, and is now poised to move up to switched virtual circuits (SVC).
- **GO WITH PVCs** if you can't stick with one ATM vendor. The standards needed to guarantee multivendor interoperability across SVCs are still too much in flux. Worse, vendors have implemented different versions of supposedly firm standards, like the User-Network Interface that connects endstations to the ATM backbone.
- **START AT BOTH ENDS** and work toward the middle when troubleshooting long-distance ATM PVC connections involving carriers. Also, when dealing with carriers, never assume a question is too dumb to ask. For example, Krystosek says the problem of pings getting lost on the IWAY network would not have occurred if Argonne had thought to ask all the carriers how they would be doing traffic policing (see story).
- **FORMAL TRAINING IS A MUST.** Furthermore, Kuhfuss warns, "You have to follow up with hands-on experience or it doesn't take."

– Elisabeth Horwitt

HALSTEAD HANNAH

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NetworkWorldReview

Switching to ATM

ATM From LAN to WAN

Our tests show five ATM forays into Ethernet network harbors.

By Edwin Mier

You've been thinking about beefing up your backbone, and the buzz about ATM has you wondering whether it might work for you. But you're anxious about how cell-based technology will fit with your existing Ethernet network.

ATM switch vendors understand your concerns. The five vendors that submitted products for testing — Agile Networks, Inc., Bay Networks, Inc., Fore Systems, Inc., 3Com Corp. and Xylan Corp. — all provide tools for switch management and virtual LAN configuration. They also offer the performance improvements Asynchronous Transfer Mode promises over 100M bit/sec Ethernet. But we found enough differences between the products to caution you to choose carefully the switch that best fits your needs.

Network World TEST ALLIANCE

Performance

There's no question that a 155M bit/sec ATM backbone link offers substantially more bandwidth for interconnecting Ethernet workgroups than does 100M bit/sec FDDI or Fast Ethernet.

We observed traffic loading of about 40M bit/sec on the ATM link, carrying real-world client/server traffic between eight workstations distributed on the two Ethernet-ATM switches. This appeared to be the upper limit of our Windows NT server's ability to send and receive traffic over the ATM link — the result of a number of interrelated factors, including disk access throughput, the ATM adapter, the adapter driver, the client/server applications being run and the particular NT processor configuration we used. Different configurations might have given us different results.

Given the same client/server interactions, this peak traffic throughput tended to be nearly the same for all the switches tested. However, a few subtle differences were noted in other aspects of performance.

Take, for example, the portion of a bidirectional Ethernet traffic stream that can traverse the switch. For traffic passing between two of the switch's Ethernet ports, the best throughput for small packets we saw — 9.4M bit/sec — was the same with Bay's Centillion 100 and Fore's ES-3810, followed closely by Xylan's PizzaSwitch (9.3M bit/sec). Agile managed 8.1M bit/sec, and 3Com mustered 7.7M bit/sec.

These throughputs tracked closely with the latencies of the switches. The latency, or transit delay, for small packets passing between Ethernet ports on the same switch (as measured by ST Bench, an application that runs on Wandel & Goltermann, Inc.'s DA-30c analyzer) was the lowest for Fore's switch at 64 microseconds. Next were Bay with 74, Xylan with 85, Agile with 119 and 3Com with 148.

Not surprisingly, the same range of latencies applied to these switches when passing small packets across an ATM backbone between Ethernet ports on different switches. In this case, though, the latency ranged from a low of 108 microseconds with Fore to 238 microseconds with Agile.

Two aspects of performance are noteworthy. The portion of a bidirectional Ethernet traffic that could be passed from one Ethernet port to another was always slightly higher within the same switch than when the traffic was sent between switches over an ATM link. The difference was not startling, only about 100K to 300K bit/sec, nor was it unexpected, due to the additional processing that occurs in an Ethernet-ATM-Ethernet scenario.

Servers on ATM

Can data be retrieved faster by an Ethernet-connected client workstation from a server that's also on Ethernet, or from a server that's on a much higher speed ATM link? Well, it turns out that the client's Ethernet link is the bottleneck.

From the tests we ran, the difference in the time it took a client to retrieve an 8M-byte file from a server on another Ethernet port, as compared to a server on a 155M bit/sec ATM link, was effectively the same. Actually, for Xylan's and Agile's switches, it was a little faster with the ATM-connected server. And it was a little faster with the Ethernet-connected server in the case of Fore and 3Com. (Bay's switch didn't support the ATM-connected server configuration.)

NO THANKS

We invited Cisco Systems, whose Catalyst switch line reportedly addresses Ethernet-to-ATM internetworking, and Newbridge Networks, whose Vivid Yellow Ridge switch also focuses on Ethernet-to-ATM connectivity, but both declined to participate without comment.

But you should note that, from a client/server response-time point of view, the client's Ethernet connection will invariably limit the speed at which data can be retrieved. The reason to consider an ATM-connected server configuration is that the server then has a full 155M bit/sec of bandwidth in each direction to and from the network. This is an improvement over the maximum 100M bit/sec that a server connected to Fast Ethernet or FDDI has.

Management and administration

Except for Bay's Centillion 100 switch, all the switches we tested provide management access in two ways: via a local terminal console, connected out-of-band to a serial interface on the switch; and inband via Simple Network Management Protocol from a graphical user interface-based management application.

Bay's switch could be accessed only out-of-band from a PC running the Windows version of the vendor's SpeedView application. This is a drawback for several reasons: First, the serial port severely limits the bandwidth for management access; second, this constrains the user to managing just a single switch at a time. The other vendors' management applications could conduct management operations with multiple switches concurrently.

The Bay application has yet to be integrated with Bay's enterprise-class Optivity application, although the vendor indicated that was in the works. Also, the SpeedView application can reportedly manage Centillion 100 switches inband via token ring, but not via Ethernet at this time. Of the switches tested, only this Bay switch offers optional support for token-ring LANs. In fact, token ring is supported concurrently with Ethernet for LAN-to-ATM connectivity.

We found 3Com's and Fore's management applications addressed a mixed Ethernet-ATM environment exceptionally well. Both vendors' packages, 3Com's Transcend Enterprise Manager and Fore's ForeView, are truly enterprise-class applications that are well thought out and scale well for managing large networks.

For example, both automatically discover and then concurrently manage all of the vendor's switches within the network. Both also support a valuable management feature in ATM networks called virtual circuit path tracing, which lets you track the logical channels between communicating end-nodes through a complex ATM backbone.

VLAN levels

Another key aspect to the management and administration of these switches is how they handle VLANs. This is a complex area, which we evaluated based on function, as well as the effectiveness and ease of use of the interfaces for creating and administering VLANs.

From a functional point of view, we regard Agile's VLAN capabilities as the richest of the five switches, with Xylan's close behind.

Agile's ATMizer 125 lets users organize VLANs around almost any mix of physical layer (port grouping), link layer (specific MAC address) and network layer (protocols such as IP or IPX) criteria.

Indeed, we saw indications that the switch can understand protocols and logical node associations even above the network layer. For example, the switch automatically built an association of users based on Novell client/server interaction and service-advertisement broadcasts. This was impressive.

Xylan's VLAN capabilities likewise transcended physical, link and network layers, although we did not observe the same degree of higher level protocol understanding that we saw with Agile's switch. But unlike Agile, Xylan's switch also supports integral IP and IPX routing, and even lets users set up routing between VLANs. Bay, Fore and 3Com let users build VLANs based on physical layer port groupings, but that's about it.

Xylan emerges the VLAN winner when we combine VLAN capabilities with VLAN management and administration. As far as the effectiveness of the management interfaces for configuring VLANs, both Xylan's and 3Com's are exceptionally rich in the options they offer users for structuring and administering VLANs. For ease of use, we rate the VLAN interfaces of Bay and Xylan as the most intuitive and well organized.

Managing ATM back-to-back

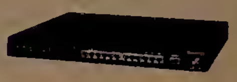
With a single back-to-back 155M bit/sec ATM link, more than 300M bit/sec of bidirectional bandwidth is available between Ethernet workgroups. To see how well this works in practice, we connected two of each vendor's switches via

SCORECARD

	Agile	Bay	Fore	3Com	Xylan
Overall score	**5.7**	**5.1**	**6.1**	**6.1**	**6.4**
Networking and connectivity (20%)	5	3	7	7	7
Management/administration (20%)	5	4	7	7	6
Features (20%)	7	7	4	6	6
Performance (15%)	5	7	7	5	7
Flexibility and ease of use (15%)	6	6	6	5	7
Installation and documentation (10%)	6	3	5	6	5

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.

NetResults

Product	**ATMizer 125, running software Version 3.32**	**Centillion 100, running System Code 1.3.1**	**ES-3810 Workgroup Ethernet Switch, running software Version 4.0.0**	**LinkSwitch 2700, running software Version 3.00**	**PizzaSwitch, running Switch Code 2.03**
Vendor	Agile Networks, Inc. (508) 263-3600 www.agile.com	Bay Networks, Inc. (408) 988-2400 www.baynetworks.com	Fore Systems, Inc. (412) 772-6600 www.fore.com	3Com Corp. (408) 764-5000 www.3com.com	Xylan Corp. (818) 880-3500 www.xylan.com
Price as tested	$38,500 for switch with 12 Ethernet and 2 155M bit/sec ATM ports, including an integral 6-port ATM switch; $4,500 for management software for managing 2 switches ($1,500 per additional switch managed).	$22,000 for switch with 24 Ethernet and 2 155M bit/sec ATM ports; $925 for management software.	$9,490 for switch with 24 Ethernet ports and a 155M bit/sec ATM port; $2,495 for management software; plus $19,445 for a 4-port (155M bit/sec) ASX-200BX ATM switch, which is required in all cases for Ethernet-to-ATM connectivity.	$8,400 for switch with 12 Ethernet ports and a 155M bit/sec ATM port; $9,000 for management software tested (Transcend for Unix). Full Ethernet integration and operation over ATM typically requires vendor's CellPlex 7000 ATM switch – $21,300 for 4-port (155M bit/sec) configuration.	$13,500 for switch with 12 Ethernet and 2 155M bit/sec ATM ports; $1,000 for management software. For full Ethernet integration and operation over ATM, an external ATM switch is needed; we tested with Fore ASX-200BX 4-port (155M bit/sec) ATM switch ($19,445).
Pros	▲Switch software loads/reloads easily via a 4M-byte flash-memory PC Card ▲Includes a built-in 6-port ATM switch, enabling ATM-based backbone data networking without additional, expensive ATM switches ▲Can automatically build VLANs based on high-level protocol characteristics like IPX broadcasts ▲Easy to get up and running	▲Special setup options for maximum speed (TurboSwitch) and efficient use of ATM connections (CircuitSaver) ▲Supports prioritization of traffic over ATM links ▲Extensive user-tailorable packet filtering (64 filters per port)	▲Supports full-duplex operation on Ethernet ports ▲The terminal console interface is intuitive and easy to use ▲Management access to switch is supported in-band via LAN or ATM channel ▲Wide configuration flexibility; supports mix of Ethernet and 100Base-T along with ATM uplink	▲Supports full-duplex operation on Ethernet ports ▲The terminal console interface is intuitive and easy to use ▲Management access to switch is supported in-band via LAN or ATM channel ▲Wide configuration flexibility; supports mix of Ethernet and 100Base-T along with ATM uplink	▲Extremely fast and easy setup for Ethernet-to-Ethernet connectivity over ATM ▲Extensive flash memory system, good for maintaining backup configurations and operating system software ▲Integral IP and IPX routing multilevel VLANs; very good interface for configuring and administering VLANs ▲Optional support for FDDI and 100Base-T
Cons	▼Tricky to get Novell IPX working (default configuration is TCP/IP-oriented) ▼Switch didn't filter too-long/jabber packets, allowing them to pass between Ethernet and ATM ▼Ports on the switch are not numbered, which can confuse management and diagnostics ▼Many aspects of ATM operation (such as SVC) are still based on vendor's proprietary protocols	▼Even basic ATM setup is too complicated; standard defaults for basic operation are needed ▼Doesn't support in-band management access via Ethernet; limited to out-of-band access via serial port (except for token ring) ▼No online help with the management application ▼No activity LEDs on switch for Ethernet segments	▼Requires an external ATM switch for any Ethernet-ATM connectivity ▼VLAN setup and administration is very complex via command-line interface ▼No graphical display of statistics in management application, just tables of raw numbers ▼Doesn't support enough node addresses on switched Ethernet ports (limited to 4 per port, 288 per switch)	▼Requires an external ATM switch for any Ethernet-ATM connectivity ▼VLAN setup and administration is very complex via command-line interface ▼No graphical display of statistics in management application, just tables of raw numbers ▼Doesn't support enough node addresses on switched Ethernet ports (limited to 4 per port, 288 per switch)	▼Some intermittent connectivity problems with IPX ▼Very limited online help with the management software ▼Some intermittent SVC connectivity problems through the Fore ATM switch 

ATM, so that clients connected to Ethernet ports on one switch could communicate over the ATM backbone with servers connected to Ethernet ports on the other switch. The ATM network, in essence, performed like a bridged WAN link connecting two remote Ethernet LANs.

Where possible, we tried to connect the switches with a single point-to-point physical link between ATM ports on the two switches. We also decided to accept whatever default ATM parameters and settings the vendor had implemented in its switch for such a connection.

Four of the vendors tested supported this direct back-to-back ATM connection: Agile, Bay, 3Com and Xylan. Only Fore's ES-3810s could not be directly linked via ATM; instead, the ES-3810 requires an external, stand-alone ATM switch for any and all connectivity via ATM.

With Agile, 3Com and Xylan, we were pleasantly surprised to find their switches needed minimal manual configuration when establishing Ethernet-to-Ethernet connectivity over a point-to-point ATM link. For Xylan and 3Com, you don't need to know a thing about the intricacies of ATM to get this configuration up and running. A small amount of ATM knowledge is needed for the Agile back-to-back connection.

Bay's switches connected without requiring a stand-alone ATM switch, but you need a fair amount of understanding of ATM to perform some manual configuration. This was almost the same amount of ATM expertise required to configure the stand-alone ATM switch that Fore requires.

But if you have more than a couple of dispersed Ethernet workgroups in your network, you should seriously consider employing an intermediate ATM switch anyway.

That's because as the number of dispersed Ethernet workgroups grows, the number of point-to-point ATM links needed for full connectivity between all workgroups grows geometrically. With a stand-alone ATM switch, only a single ATM link between each workgroup and the switch is needed.

If you have only a few workgroups that will be interconnected via ATM, you can avoid — or at least defer — having to buy an intermediate ATM switch if the Ethernet-ATM switches you select support multiple ATM links.

That's where Agile and Bay, and to a lesser degree Xylan, have an advantage. Agile's ATMizer 125 has an optional integrated six-port ATM switch, which was included in the unit we tested.

The ATMizer 125's $38,500 price tag reflects this valuable feature. It's significantly higher than the $9,000 to $14,000 price tags for Fore, 3Com and Xylan Ethernet-ATM switches.

For comparable functionality, you'd need to add a stand-alone ATM switch — costing about $20,000 for a minimal, four-port variety — to these vendors' ATM networks.

With the six-port integral ATM switch, the ATMizer 125 can handle as many as five ATM links (one port is used for interfacing to the switched Ethernet ports).

Bay's Centillion 100 can be configured with as many as 10 ATM interfaces.

While the $22,000 price tag for the Bay configuration we tested, with two 155M bit/sec ATM links, is appreciably less than Agile's, the integral ATM switching features of the Centillion 100 are more limited.

For interconnecting with other Bay Ethernet-ATM switches, the Centillion 100 works well without an external ATM switch. You can set up large networks by connecting multiple Centillion 100s via their ATM ports.

However, the integral ATM switching that enables this is not of the same general-purpose ATM switch caliber as Agile's. The protocols used for LAN-over-ATM connectivity in the Bay switch we tested are proprietary.

Xylan's PizzaSwitch, which is preconfigured at the factory to customer specifications, supported two ATM links in the configuration we tested.

Xylan also offers a higher end, more modular, more field-upgradable and considerably more expensive OmniSwitch line for networks requiring more — or different combinations of — ports (including token ring, which is not supported in the Pizza-Switch). An OmniSwitch configured with the same 12 Ethernet and two ATM ports costs roughly double the $13,500 price of the PizzaSwitch we tested.

Ethernet clients to ATM servers

We also examined the switches in a configuration where clients connected to Ethernet ports access servers directly linked to the ATM network.

We invited each vendor to provide its

See **Switches**, *page 40*

ONLINE

For more detailed point-by-point comparisons of each of our five switches, link to Network World Fusion. Select NetRef, Buyer's Guides and Reviews, then ATM Switches.

http://www.nwfusion.com

How LANs and ATM differ

Many users view traditional LANs and Asynchronous Transfer Mode as oil and water. And while the products tested in this evaluation are specifically designed to make the two complement each other more like oil and vinegar, the differences are likely to persist for a long time.

For example, ATM is connection-oriented; a logical channel needs to be set up between communicating end nodes before they can exchange data. By comparison, all traditional LANs — Ethernet, token ring, FDDI, and even the newer Fast Ethernet and 100VG-AnyLAN — are shared-media; they provide a single fixed-bandwidth channel that all attached nodes share.

Where traditional LANs were designed so that any station could easily broadcast information to some or all of the other stations on the same LAN, it is very difficult to do the same type of broadcasting over an ATM network.

The shared-channel structure of traditional LANs makes them better suited for traditional data traffic, characterized by short-duration bursts. However, ATM shines with new applications and services that involve dedicated-bandwidth channels, full-duplex exchange between communicating endpoints and protracted connect or session times — such as multimedia, client/server and videoconferencing. ATM's ultimate potential to efficiently handle any mix of traffic types over the same network facilities and infrastructure makes it an attractive choice for the future.

— Edwin Mier

HOW WE DID IT

We configured two different networks in our lab for evaluating the Ethernet-ATM switches (see graphic).

In the first, which we call Ethernet-ATM-Ethernet, we linked each vendor's two switches via their ATM ports. These were 155M bit/sec, multimode-fiber ATM links. We used a back-to-back connection — a direct point-to-point ATM link between the two switches — for all of the vendors except Fore, which requires an intermediate ATM switch. In this configuration, Ethernet-connected client workstations on one switch communicated with Ethernet-connected servers on the other across the ATM network.

In the other configuration, Ethernet-ATM, we used only a single switch to allow Ethernet-connected clients to communicate with an ATM-connected server.

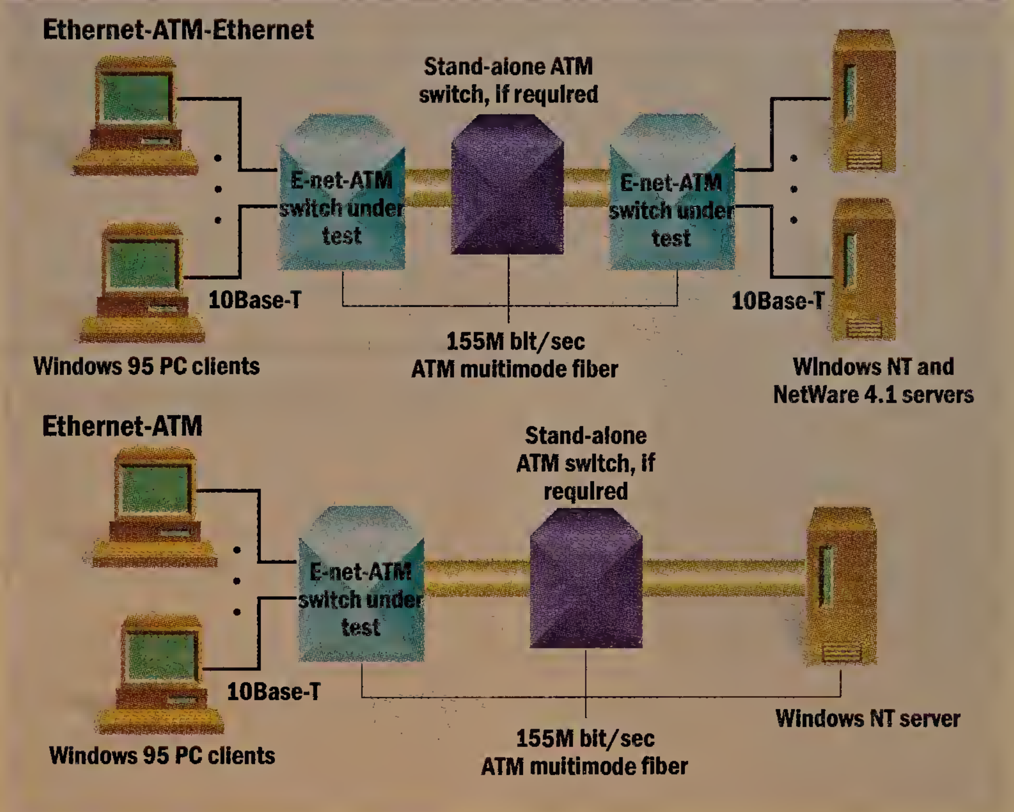
With Fore, 3Com and Xylan, this configuration required an intermediate ATM switch. Agile's ATMizer 125 included an integral six-port ATM switch and didn't require an external one. Bay's Centillion 100 did not support connectivity between Ethernet clients and ATM-connected servers, regardless of whether an external, intermediate ATM switch was present.

Our client workstations, 90-MHz Pentium board PCs from ChatCom, Inc. and Cubix Corp., ran Windows 95 and communicated with either a Windows NT 3.51 or a NetWare 4.1 server in the Ethernet-ATM-Ethernet environment. In the Ethernet-ATM environment, our Windows 95 clients connected to a Windows NT server. The ATM adapters used in the servers in the Ethernet-ATM tests were plugged into PCI bus slots of the server motherboards.

We used a Hewlett-Packard Internet Advisor analyzer to inject many different types of error packets into an Ethernet port and ascertain whether the switch passed them onto the ATM network and delivered them to the other Ethernet workgroup. In addition, we used a Wandel & Goltermann DA-30c traffic analyzer to measure how much of a bidirectional Ethernet traffic stream could be passed between the switches over the ATM backbone in the Ethernet-ATM-Ethernet configuration.

We also employed a special ATM analyzer, CellBlaster from Net2Net Corp., to monitor and analyze traffic and signaling on ATM links. This PC-based system, with special ATM cards, can passively monitor all traffic passing over a full-duplex, 155M bit/sec ATM link.

Test environments for Ethernet-ATM switches


Ethernet-ATM-Ethernet
Stand-alone ATM switch, if required
E-net-ATM switch under test
E-net-ATM switch under test
10Base-T
10Base-T
155M bit/sec ATM multimode fiber
Windows 95 PC clients
Windows NT and NetWare 4.1 servers
Ethernet-ATM
Stand-alone ATM switch, if required
E-net-ATM switch under test
10Base-T
155M bit/sec ATM multimode fiber
Windows 95 PC clients
Windows NT server

ATM standards

Continued from page 34

critical only where bandwidth is in short supply. For many networks, 100M bit/sec Ethernet offers enough bandwidth to keep even real-time applications running smoothly. Yet as Fast Ethernet reaches more endstations, what can supply enough bandwidth in the backbone? Stable gigabit Ethernet products are at least a year away, whereas ATM is available at 622M bit/sec today.

Jerry Coleman, system and network manager at Pacific Investment Management Co., had scalability in mind when he selected ATM switches from Fore to interconnect his file servers. "We had the need for large data transfers between systems," he says. "ATM is pretty stable, and it's probably two years ahead of Fast Ethernet in terms of going to another speed. I'll believe gigabit Ethernet when I see it." Now Coleman is testing Fore's 25M bit/sec ATM. "We're looking at video to the desktop," he reports, "so that traders can keep an eye on CNN."

Meanwhile, support for QoS increases. The WinSock 2 API, soon to be shipped with Windows NT and Windows 95, lets applications open connections and specify QoS requirements to the network (see Figure 3, page 34). Cells in Frames (CIF), a new concept backed by more than 30 vendors, uses a format similar to the Frame UNI to extend ATM virtual circuits over conventional LANs. With CIF, ATM can reach end-to-end without disrupting desktop hardware.

The only certainty is. . .

Current ATM Forum specifications provide a stable platform for high-performance networking, and the Anchorage Accord will help rationalize ATM's future. ATM will grow to dominate the wide area, often as transparent infrastructure, but the struggle with Ethernet will continue in the local area. Architectures for internetworking over ATM will be driven more by vendor positioning than by standards, and as always, a continuous supply of hype will be the only certainty.

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Dig deeper into ATM by checking out these resources:

- The ATM Forum home page, where you can keep up to date on the group's standards efforts and specifications.
- Ipsilon's site, where you'll find the company's IP Switch Protocol Specifications and technical papers.
- 3Com's site, where you can learn more about the Network Interoperability Alliance from the original press release announcing its formation and a technical white paper describing its objectives.

Select NetRef, Technology Resources then Broadband

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http://www.nwfusion.com

Switches

Continued from page 39

choice of PCI bus, multimode fiber-based, 155M bit/sec ATM adapters for testing this configuration. Or, if they preferred, we would select and use the network interface card of our choice (we had Adaptec and Fore ATM adapters on hand). Agile furnished an Interphase adapter; 3Com and Fore provided their own PCI bus ATM adapters, while Xylan was content to let us use a Fore adpater.

We found that, with the current release of software in Bay's Centillion 100 switch, the Ethernet client-to-ATM server configuration was not supported. Bay says future software releases will support this topology.

Of the remaining four vendors, all except Agile (which, as noted earlier, has its own integrated ATM switch) required a stand-alone ATM switch to support this configuration. Therefore, we invited the vendors to provide their choice of an external ATM switch for this configuration; if they preferred, we would use our lab's Fore ASX-200 switch. 3Com provided one of its CellPlex ATM switches for use in testing its Ethernet-ATM switch. We used the Fore ATM switch for testing both the Fore and Xylan Ethernet-ATM switches.

With Agile's ATMizer, we connected the server to an ATM port and were passing TCP/IP client/server traffic in about 15 minutes. As long as your traffic is TCP/IP, the Agile switch's installation and setup is without question the easiest and most user-friendly of the ones tested. Unfortunately, setting up the switch for other protocols, such as Novell's IPX, requires more work and careful attention to detail.

3Com's LinkSwitch 2700 ranks as the next easiest to set up and configure for Ethernet client-to-ATM server connectivity. We used 3Com-supplied ATM adapters (3C971-Fs) and a 3Com-supplied CellPlex 7000 ATM switch. After about 45 minutes, we were up and running; most of the effort involved setup of the ATM switch.

Setting up the Ethernet client-to-ATM server configuration with Fore's gear was only a bit more involved, mainly in configuring the Fore ASX-200BX ATM switch. Fore also submitted its own server adapters.

Xylan's equipment, which was among the easiest to set up for the back-to-back Ethernet-ATM-Ethernet configuration, was probably the most involved to get running in the Ethernet client-to-ATM-server environment, mainly because Xylan doesn't make ATM switches with the components needed to do standards-based Ethernet LAN emulation over ATM. Therefore, we employed the same Fore adapters and ATM switch that we used in Fore's configuration.

The alliance is a co-operative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 31.

Mier is president of Mier Communications, Inc., a Princeton Junction, N.J.-based network consultancy, product test center and technical publisher. Mier can be reached via E-mail at ed@mier.com or by phone at (609) 275-7311.

Interoperability is an issue

It was not our intent to verify the switches' compliance or conformance with the multitude of standards emerging from the ATM Forum. For the most part, we confirmed that the Ethernet-ATM switches worked with those from the same vendor as well as with the ATM switches and adapters provided by that vendor.

Only in the case of Xylan, which does not make its own pure ATM switch and adapters, were we forced to test ATM interoperability between vendors — specifically, between Xylan's Ethernet-to-ATM PizzaSwitch and Fore's ATM switch and PCI-bus adapters. (Xylan's higher end OmniSwitch family, which wasn't tested, can be configured with only ATM interfaces, but the product line is more oriented toward store-and-forward switching between a mix of LAN/ATM technologies.)

In the Xylan-Fore case, everything worked but a few anomalies did pop up. For example, about 15 minutes after a switched virtual circuit (SVC) ATM session was established and copious data was exchanged between a client on PizzaSwitch's Ethernet port and a server connected to the Fore ATM switch, the connection would inexplicably go to sleep and data would no longer pass.

We did not determine with certainty where the problem was originating, but we did discover that we could clear the problem by resetting the Fore ATM switch.

The moral of this story is that full ATM interoperability between different vendors' equipment still is not assured. This particular problem may have been with Xylan, or with Fore, or it may have been an anomaly in the SVC specification that both have implemented. You, too, can expect to encounter such situations, at least until the full set of common ATM specifications has been more fully implemented, debugged and tested for interoperability.

—Edwin Mier

Argonne

Continued from page 36

checked out local equipment, then investigated each of the service providers involved.

It turned out one carrier was monitoring traffic levels by measuring the time between cells, rather than the total number of cells going over a link at any particular time. "The interval between cells in a ping packet is quite short, and the carrier was just dropping those cells whose interval was not within its specifications," Krystosek says.

One clear insight drawn from the IWAY project is that PVCs won't cut it on an ongoing cross-agency ATM network. Even for IWAY, which was a one-shot demonstration, "we had people typing in PVC [tables] for days," Krystosek says.

In IWAY's aftermath, Argonne and a number of other research institutions are exploring the possibility of an ongoing interagency network "rather like an ATM-based Internet," Kuhfuss says. "There are a whole suite of major initiatives to bring collaborative software to laboratories and make them one large facility." Commercial companies with heavy-duty research laboratories, such as Ford Motor Co., General Motors Corp. and McDonald's Corp., are also getting involved.

Former IWAY participants are also "going back to the beginning and looking at the infrastructure to see whether IP is the right interface, or whether it should be straight ATM-based applications, or whether it should really be IP over SONET," Kuhfuss says. SONET "doesn't have ATM's 53-byte cell overhead — there's a lot of addressing information on every ATM cell," he adds. "Remove that layer, and in theory you can write IP right down to SONET, for people who really need a lot of bandwidth."

Learn more about what Argonne is up to from the organization itself. We've built links to a number of sites, including:

- ▶**Argonne's home page**
- ▶**The Electronics and Computing Technologies division home page**
- ▶**Mathematics and Computer Science division home page**
- ▶**Argonne's Futures Lab**
- ▶**The Argonne CAVE site**
- ▶**A site explaining the IWAY effort**

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Still, with all its limitations and immaturity, ATM remains the broadband networking technology of choice both for Argonne and for the research community in general. "Two years ago, we made the decision that ATM is the best path for us," Kuhfuss says. So far, Argonne has seen no reason to change that judgment.

Horwitt is a freelance writer based in Waban, Mass. She can be reached via the Internet at 75244.1666@compuserve.com.

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Briefs

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The **ATM Success Strategies for Users** *conference will be held July 29-31 in Chicago. You can attend conference or workshop sessions on Asynchronous Transfer Mode deployment, migration and implementation; ATM applications and switching systems; ATM options to the desktop, in the backbone and over Synchronous Optical Network (SONET); and LAN emulation.*

The cost for the conference only is $1,295. The conference plus one or two workshops costs $1,695 to $1,995. Groups of three or more receive a 10% discount.

International Quality & Productivity Center: (800) 420-2145.

It's time to consider bringing ergonomics to the desktop

Providing highly adjustable workstations can make life less painful for end users.

By Carol Sliwa

The desktop, quite literally, should be as important a consideration as the hardware, software and wiring that go into linking clients to your network.

Make the workstation adjustment

Doctors who treat repetitive strain injuries say one of the best things to do for computer users is acquire adjustable equipment that can be positioned to fit their needs. Here are some tips on the following pieces of equipment:

CHAIR: Get one that enables users to sit at a height that puts their feet firmly on the floor and has a tilt seat and back that permits them to create a comfortable angle between their thighs and back.

KEYBOARD AND MOUSE: There is great debate when it comes to the type of keyboard and mouse to use. But a few things are clear. Keyboards should be on a tray that can be raised and lowered so users' wrists are kept straight and hands can hover over the keys during typing. The mouse should be kept as close to the keyboard as possible.

MONITOR: There are various monitor stands that permit users to properly position the top of the screen at or slightly below eye level and an arm's length away. Monitors should be kept at a 90-degree angle to windows and other bright light sources to minimize glare.

How well you select ergonomic equipment can play a vital role in keeping your employees free from the pain, numbness and tingling that has victimized a great number of computer users, say professionals who study occupational injuries.

Likewise, getting involved in the physical layout of the workspaces helps to ensure an ergonomically correct workstation will fit neatly into the office environment.

When properly used, that workstation can help prevent the repetitive strain injuries (RSI) that, at their most severe, have led to long-term and even permanent disabilities.

"One of the keys here is to give people as much control over their workstations as possible," advises Dr. Thomas Armstrong, a professor of occupational health at the University of Michigan. Armstrong has conducted studies on the links between work and musculoskeletal disorders.

U.S. labor statistics show that reported RSI cases have been rising dramatically over the past 10 years. This class of injury includes carpal tunnel syndrome, which has afflicted thousands of computer users. The federal government's Bureau of Labor Statistics in 1992 started to track injuries that relate to repetitive typing or key entry.

Reports show that 13,252 people suffering from RSI brought on through typing or key entry missed at least a day of work in 1994. There's a reluctance in certain circles to take RSI seriously because the disorder produces no visible wounds. But, those in the field insist the problem is not only real, it's probably on the increase.

"People are working more and more hours on the computer, and companies are reporting rising rates in general in the office settings that we work with," notes Dr. David Rempel, a physician who directs the ergonomics programs at the University of California at Berkeley and San Francisco.

The cost of RSI to employers can be excessive in terms of lost time and productivity, as well as the potential for worker's compensation claim hassles.

"There's all this litigation," says Dr. Emil Pascarelli, a professor of clinical medicine at Columbia University and co-author of the book *Repetitive Strain Injury: A Computer User's Guide.* "The lawyers end up making all the money. I'm always doing depositions on this stuff, and you get 10, 15 doctors involved."

Pascarelli's advice? Prevention, prevention, prevention.

The path to that end may not be the same for everyone because experts don't always share the same views on specifics. For instance, some think users benefit from wrist rests; others frown on them. Some swear by negative-tilt keyboards, which tip the top rows lower than the bottom ones to keep wrists straighter; others disagree.

However, they agree on general pieces of advice, particularly the need to:

- Provide adjustable equipment to computer users so they can adapt it to suit their needs.
- Make sure that users are trained on the proper placement, adjustment and use of ergonomic equipment, as well as the best technique for typing at the computer, taking into account factors such as posture and vision.
- See to it that workers pace themselves and take rest breaks. Getting up to stretch every 20 to 30 minutes is recommended.

"You just can't give people this equipment and expect that they're going to use it properly any more than you would give a tennis racket to somebody and expect them to win the U.S. Open," Pascarelli says.

Companies that haven't already implemented a policy for safe computer use should consider developing one that includes a systematic training approach and an injury reporting system, Rempel says.

"People need to be encouraged to report symptoms early to the supervisor or the health and safety office so that problems can be addressed early on," Rempel says.

"One thing that's very clear from the medical literature is that you need to jump on these problems."

Any aches, pains, tingling, numbness or loss of strength in the hands, arms, shoulders or neck should be taken seriously, Rempel warns.

"If they occur for a few minutes, it's not a big deal," Rempel says. "But, if they last into the night, and especially if they're with you the next day, you should definitely pay attention."

Clearly, employers and employees share important responsibilities when it comes to preventing RSI, and you hardly have control over every element that figures into the preventive mix.

But raising awareness about the problem on all fronts is a good step, experts agree.

Naomi Swanson, chief of the National Institute for Occupational Safety and Health's (NIOSH) motivation and stress research section, suggests you seek out education on ergonomic issues, be aware of employees' workload and time demands, and pay attention to "job stressors" that have been linked to RSI.

Visit Network World Fusion for more ergonomics information, including:

▶ A draft of the Occupational Safety and Health Administration's ergonomics protection standard.

▶ An overview of what you'll find on the ErgoWeb site, which maintains a collection of ergonomics standards and guidelines, job review and analysis tools, and case studies.

▶ A rundown of resources at the Ergonomics Program Web site maintained by the University of California. Select Careers then ergonomics.

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NIOSH has noted higher rates of RSI in companies where employees are affected by job stressors such as:

- Monotonous, repetitive work.
- Tight deadlines.
- A high workload and work pace and low control over it.

"When people hear the word 'ergonomics,' they usually think about furniture, and it's much more than that," Swanson says. "You have to look at the workplace in a holistic fashion." ■

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- Automated Test Tools Development
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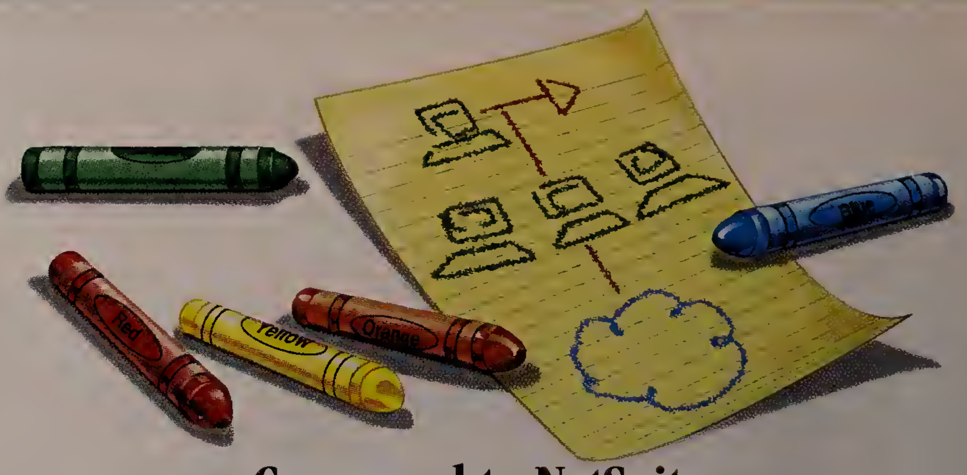

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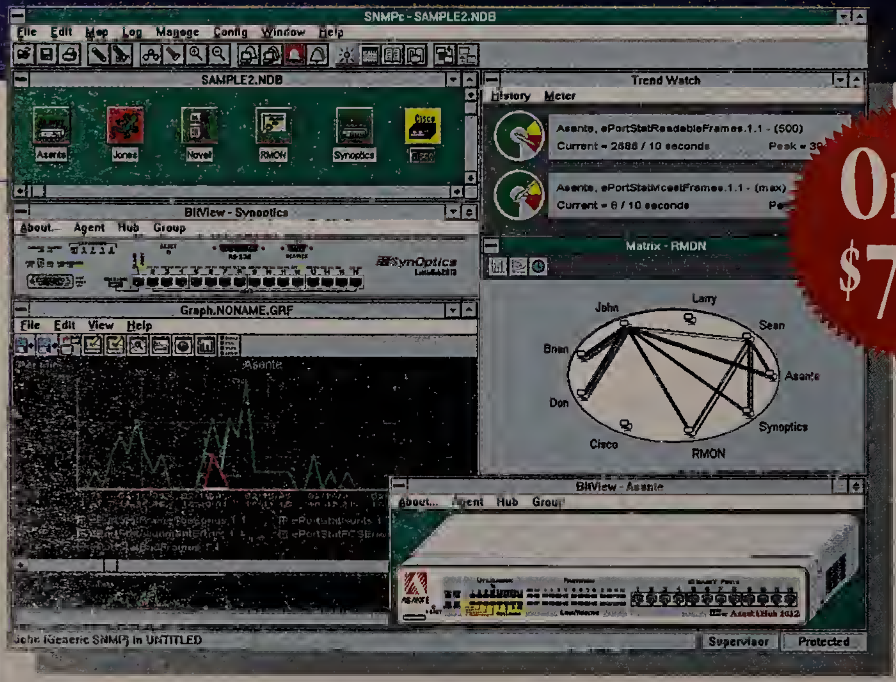

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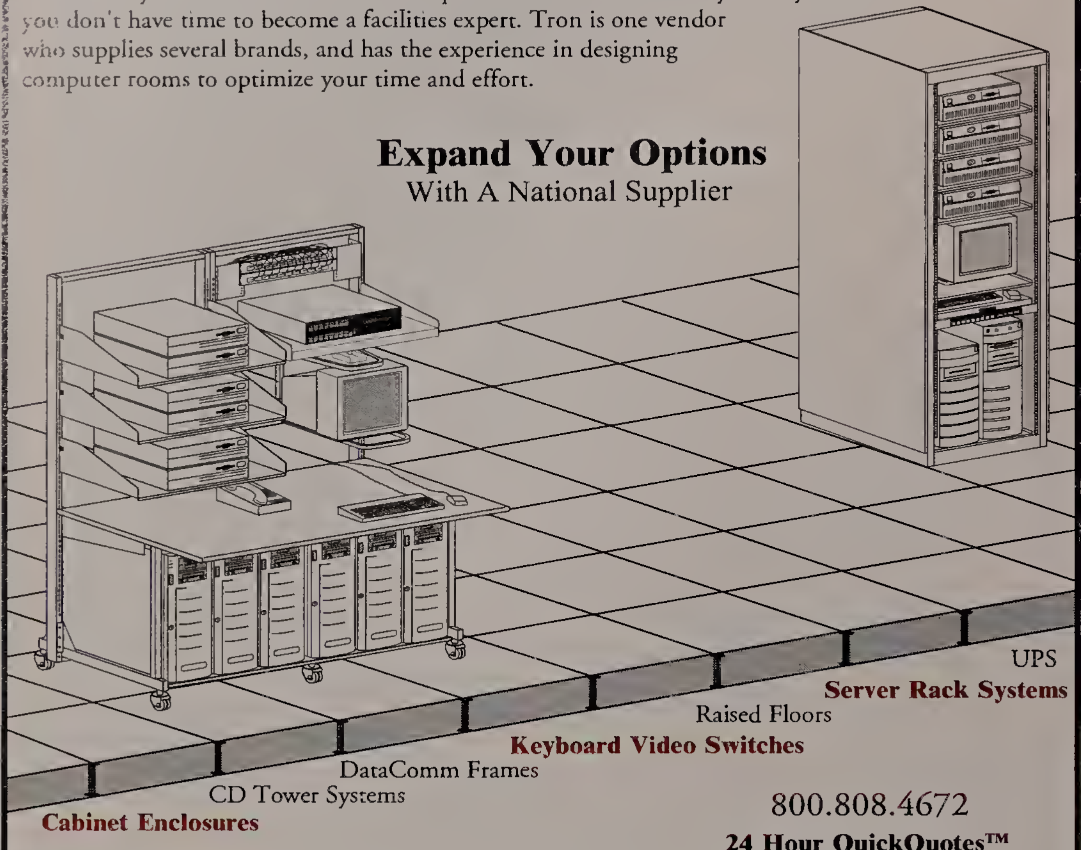

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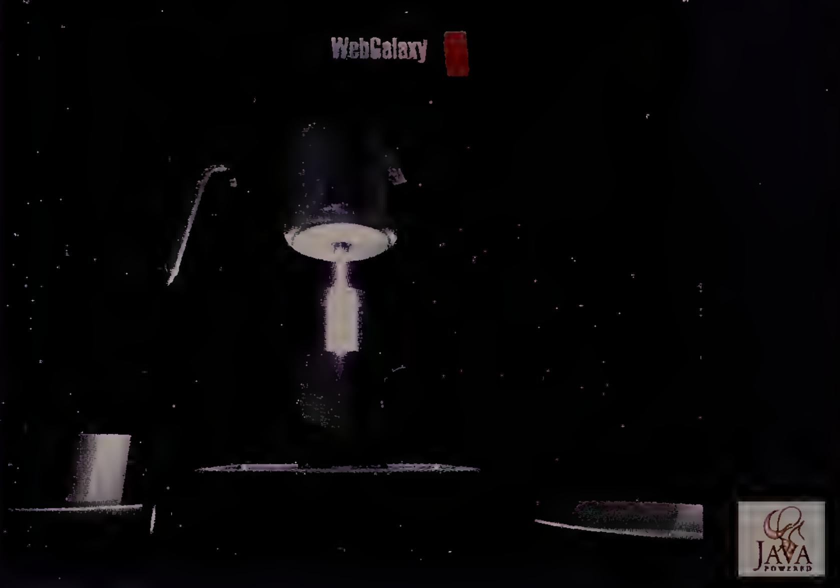

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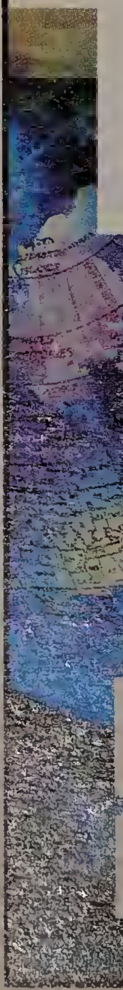

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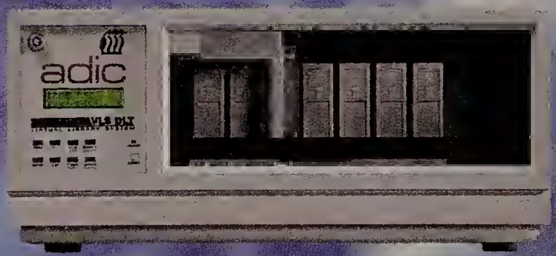

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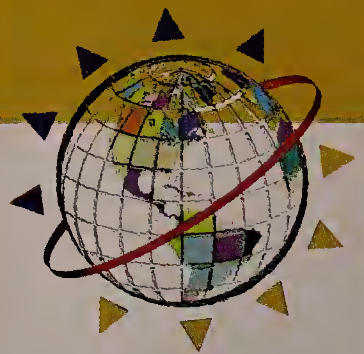

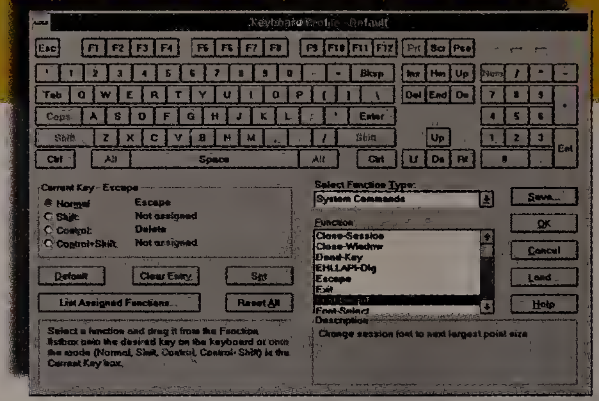

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Select a function and drag it from the Function listbox onto the desired key on the keyboard or onto the mode (Normal, Shift, Control, Control+Shift) in the Current Key box.

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Highlights:

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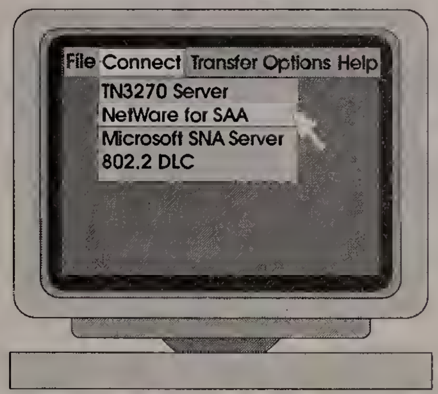

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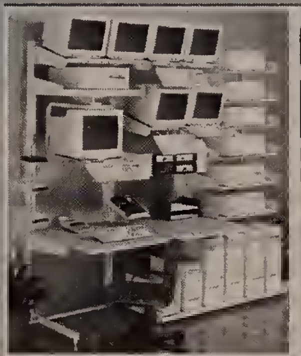

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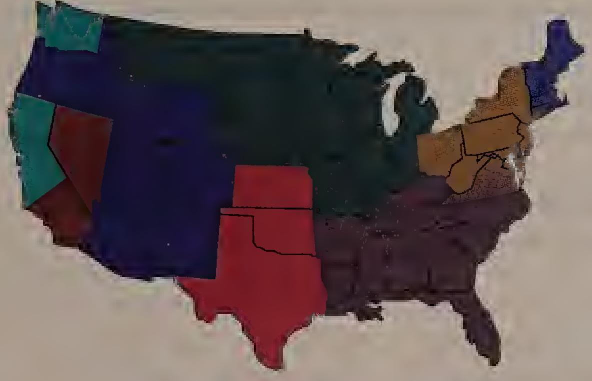

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Clusters

Continued from page 1

While clustering has been around for years on machines running Unix and proprietary operating systems, PC server-based clustering is only now emerging.

Database front-runners

So far, it looks like Oracle Corp. and other database vendors are out in front in this area, largely because they already have multiprocessing versions of their applications on the market that are designed to run on machines powered by Intel Corp. processors.

"All these vendors are singing the same tune: 'We're not going to wait for Microsoft's API. We see a demand for customers right now to have two-way failover,' " Lowber said.

It shouldn't be a stretch to run Oracle Parallel Server, for example, across a Windows NT server cluster. The database can be partitioned across a cluster of processors; information requests go through a transaction monitor, which gathers data from the appropriate processors.

Other companies such as SAP AG may fall short when it comes to supporting clustering for individual applications on Windows NT clusters. However, SAP's Application Link Enabling technology does permit components of its R/3 business suite — such as human resources and financial applications — to communicate with each other from different nodes in a cluster.

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Microsoft Corp. officials said the company is trying to make it easy for vendors to build applications that work with Windows NT-based server clusters. The company is supposed to deliver by year-end a developer's tool kit for its Windows NT clustering extensions, dubbed Wolfpack.

The officials declined to say how many software developers have committed to support its clustering technology, though a recent Microsoft briefing on Wolfpack drew about 60 hardware vendors, software developers and customers.

Microsoft's intent in distributing the APIs is to make available a communications layer between applications and Microsoft's Cluster Manager, a key Wolfpack component. Cluster Manager will perform administrative tasks, such as providing a graphical user interface that enables end users to see which servers the applications are running on, and will also trigger a series of actions if a server fails.

As long as a developer writes to the Wolfpack APIs, its application will work on servers running in failover and, eventually, distributed cluster environments, said Mark Wood, a product manager at Microsoft's business systems division.

Tandem Computers, Inc., which has developed a PC server clustering technology called ServerNet that Compaq Computer Corp. and others plan to support, said its drivers will be transparent to any application that supports Wolfpack, the reason being that ServerNet drivers are included in the Microsoft APIs.

Hewlett-Packard Co. officials said PC server clustering will attract plenty of applications vendors, as was the case with clustering of Reduced Instruction Set Computing-based machines running Unix. HP is bringing its proven MC/ServiceGuard software, which now runs on Unix machines, into Windows NT server clusters.

More than 1,000 applications, including those for online transaction processing, data warehousing and databases, run on Unix machines equipped with MC/ServiceGuard, said Gabe Gotthard, an HP product marketing manager. All the independent software vendors had to do was write to the HP-UX operating system and their application would be cluster-aware via the MC/ServiceGuard middleware layer.

With a cluster-aware Windows NT on the way, those 1,000 applications need only be ported to the operating system for them to work on PC server clusters, Gotthard said.

Clustering: The real deal?

If you believe the PC server hardware and operating system vendors, there will be no shortage of applications to run on NT clusters. But what will the market for these clustered environments be?

Goulde said it is too early to make solid projections but added, "Microsoft will bring a low-cost, high-volume solution that will make everybody want some kind of clustering system."

Clustering collection

A sampling of clustering technologies and the applications that customers can run initially on their PC servers configured in failover mode:

Server vendor	Cluster technology	Applications
HP	MC/ServiceGuard (being extended from Unix to Windows NT)	Oracle7, SAP R/3, Sybase System 11 and other applications that now run on the Unix version.
IBM	Vinca's StandbyServer failover clustering product for OS/2, NetWare and Windows	DB/2, Oracle and SyBase databases; expect Notes clusters soon.
Compaq	Online Recovery Server	Oracle7 and Microsoft SQL Server 6.5; Informix and SyBase database support coming soon.
Digital Equipment	On Clusters for NT 1.0 for failover of file services	Oracle Workgroup Server and Microsoft SQL Server 6.5

It's obvious the hardware vendors cannot wait to get products on the market. Peter Lowber, senior analyst for Datapro Information Services Group, said server vendors have adopted both short- and long-term strategies.

"All these vendors are singing the same tune," Lowber said. "They're saying, 'We're not going to wait for Microsoft's API. We see a demand for customers right now to have two-way failover. But we will support the API when it comes out.' "

Windows NT "is still far behind" Unix when it comes to clustering, Lowber said, but just as in other areas, "NT is catching up pretty quickly." ■

Secure

Continued from page 8

product line.

NSC itself offers a data encryption device, BorderGuard, that it says creates secure "private sleeves" through the Internet or other unsecured networks. The bridging device typically sits behind a branch office router that has links to the wide area and encrypts Ethernet or FDDI traffic.

Rick Randall, Unix administrator and Webmaster at PC Service Source, is setting up electronic ordering over the Internet for its PC parts customers, and has called in NSC to pitch its services.

The company also wants to make sure its policies about which employees can access which databases adequately protect proprietary data, according to Randall.

A security audit using NSC, Guidry and WheelGroup costs $9,000 per day.

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Cabletron

Continued from page 1

bone option that does not require them to learn a completely new technology, such as ATM.

"There's been a long-thought view that you had to go to ATM cell switching if you wanted to do mixed [voice, video and data] services or to get gigabit-type data rates," said Chris Oliver, director of engineering and manufacturing at Cabletron. "But we can offer that with gigabit Ethernet."

He added that advances in the IP world — such as the Resource Reservation Protocol (RSVP) — make it possible for an application to specify quality of service without requiring ATM. Quality of service is a feature that ensures application traffic is given the priority it warrants.

Cabletron's Multi Media Access Center-Plus backbone chassis boasts an aggregate switching capacity of about 10G bit/sec, allowing the switching hub to support up to 10 of the one-port gigabit Ethernet modules.

"Competitors' boxes [Bay Networks, Inc.'s System 5000, Cisco Systems, Inc.'s Catalyst 5000 and Digital Equipment Corp.'s GigaSwitch] will not be capable of handling 10G bit Ethernet links, and probably not even one or two 1G bit/sec interfaces," said Karl Shimada, vice president of market research at Rising Star Research, a consultancy in Lakewood, Colo. "The switching capacity of the MMAC-Plus sets Cabletron apart."

Cabletron, a member of the Gigabit Ethernet Alliance, also plans to go beyond the gigabit mark to offer switch interfaces that support speeds of many tens of gigabits per second. The company's next-generation switching technology will increase the MMAC-Plus' aggregate switching capacity from 10G to 50G bit/sec, which could allow the chassis to support 10 5G bit/sec uplinks, for example. The multigigabit gear is expected to hit the market in the next two years, Oliver said.

"When people talked about gigabit speeds a couple years ago, we used to think that was a crazy amount of bandwidth," Oliver said. "But if every user has a dedicated 100M bit/sec link to the desktop, the switch in the wiring closet is going to need a multigigabit uplink."

"The switching capacity of the MMAC-Plus sets Cabletron apart," says Shimada, vice president of market research at Rising Star Research.

Oliver said that 10M/100M bit/sec switched Ethernet will become the standard connectivity choice for the desktop over the next two to three years. At the same time, the preferred uplink technologies will be gigabit or multigigabit Ethernet interfaces, and ATM cell-based switch links.

In fact, Cabletron plans to greatly reduce the price per port for 10M/100M bit/sec switched access. Later this year, Cabletron will cut in half the price of its enterprise-level switches from $600 to $300 per port and slash the cost of its workgroup switches from $300 to $100 per port. Oliver said the price reductions will help push fast LAN technology into the mainstream, and spur demand for gigabit-level gear.

Cabletron customer Ken Cieszynski, network engineer at United Air Lines, Inc. in Chicago, said gigabit Ethernet is just too high end for his network needs. "Even our power users, who are putting live weather feeds over the net, are having a hard time filling up our 10M bit/sec switched Ethernet links to the desktop," he said. "So we don't have a requirement for gigabit Ethernet."

But industry observers said that customers running a lot of imaging applications will drive the requirements for gigabit Ethernet.

Another differentiator of Cabletron's gigabit Ethernet device is that it can connect different media types such as FDDI, token-ring and ATM — not just Ethernet and Fast Ethernet.

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Bennett

Continued from page 1

Is your organization focusing mostly on the residential market, the business market or is it roughly a 50-50 thing?

It's 50-50. We have resources dedicated to the business market, resources dedicated to the consumer market, and then — from a regulatory and legislative process — resources dedicated to both.

Judging by what has been reported, your initial services will be based on resale agreements with the local companies.

For initial market entry to the small business and residential customer, resale is our only solution.

As you move up in the business market, we will use POTS resale, but we also are working on Centrex resale. And we're working on what we call the 4E local solution, which gives us the ability to take the existing network configurations of our large customers [who have dedicated access lines into AT&T's 4ESS switches], add local traffic and route it accordingly.

AT&T Chairman Robert Allen and others have talked about needing 25% to 40% discounts from the RBOCs to profitably resell local services. Doesn't that assume the RBOCs today are making that level of profit?

What the Telecommunications Act said was the discount rate ought to be a function of avoidable costs. If we are reselling RBOC services, the RBOCs won't have the retail relationship with the customer, so there's an avoidance of marketing and sales costs.

[Then,] depending upon what happens with the FCC's Aug. 8 ruling [setting mandatory RBOC interconnection standards], we hope to have a very competitive offer through unbundled elements.

Meaning, longer term, you hope to roll out services based on service elements that the RBOCs offer on an unbundled basis?

Yes. Short term, we're hoping to enter all 50 states next year with a resale offer. As soon as we can thereafter, based on the economics of each marketplace, we will move to a facilities-based offer. Facilities-based might mean facilities leased from other people.

In some markets, [our facilities-based networks will be entirely composed of] unbundled elements from the RBOCs, assuming we get a favorable ruling. In other markets, we'll probably use some of our own switches. And we'll also use CAPs where possible.

Our basic strategy when it comes to building [facilities] is efficiency of capital. We're not about to misuse or abuse capital. In other words, this is all about taking advantage of the existing assets that are there today, and coming up with the best solution for us.

Are you building any facilities-based networks anywhere right now?

We're building in Chicago and Los Angeles right now. But when I say 'build,' I don't necessarily mean we're physically digging up streets and laying our own fiber. If there is a CAP there, or if the RBOC's unbundled prices are competitive, we'll use their facilities. By the definition of the Telecom Reform Act, that's the same as being a facilities-based carrier.

OK. But will you lay some of your own fiber in those two areas?

Yes. That is going on today. That's a very cumbersome process in terms of right of ways; you have to deal with every local community.

Where will you concentrate your facilities-based efforts?

We're looking at what some people call the NFL cities. We'll look at the requirements then build a ring structure for those cities, depending upon the traffic volumes and other requirements.

Why would it be more effective to install your own infrastructure in one market vs. another?

It's a function of the number of CAPs in the market. It's a function of the unbundled elements. Even though we expect the FCC to set some pretty rigid rules, it's really going to turn out to be a state-by-state implementation.

How many switches, if any, do you have today capable of carrying local traffic?

We don't have any switches capable today. We are working on having switches up in, I'd say about five or six major locations, hopefully this year.

When you enter negotiations with local carriers, do you typically deal with entire regions or individual states?

Most of the issues we're trying to deal with at the regional level. But then when you get to cost structure and actual discounts per state and all that, it reverts to the state. And, of course, the decision-making body is the state commission.

Do you think RBOC interconnection agreements will be reached before the statutory limit of 135 days, or do you expect them to go before arbitration?

I think major issues will go before arbitration. Day 135 for most of those negotiations is about the middle of this month. So we're starting to get a feel for which issues will go to arbitration. But I think a number of issues will go to arbitration.

Such as?

Discount rate, maybe some of the interconnection standards, use of directory assistance, operator service platforms, a number of unbundled elements, those types of things.

Do you believe that there are some RBOCs where the negotiations won't end up in arbitration?

I think there will be arbitration in every RBOC. What we don't know yet is the extent of those arbitration cases.

After arbitration, appeals lead to the federal district court. Do you expect some of those to go to litigation?

Yes.

How long will it take before you can reach interconnection agreements you're happy with?

PHOTOS: STEVE BORNS

We will have all the elements lined up by the end of the year. And then in some cases, we'll have service available, depending upon how many of the elements we were able to get squared away face-to-face.

For example, if the only element that we didn't get squared away was wholesale discount, I can still go build and do my systems and infrastructure, and passing of orders. Then it's just a matter of filling in the rate fields on the actual costs and prices.

On the other hand, if we don't have any interconnection standards and we haven't agreed how to route operator services traffic, and all of those, then that requires a fair amount of work.

The interconnection agreement that MFS [Communications Company, Inc.] made with Ameritech [Corp.] seems to have some elements AT&T would not necessarily agree to, such as lower levels of discounts for resale and interim number portability. It seems there's a divergence of opinion between AT&T and competitors that already have facilities in the ground, like MFS.

I think if you look at MCI's agreement with BellSouth [Corp.], or MFS's agreement [with Ameritech], what they're trying to do is just get interconnection agreements between existing facilities-based networks. To us, that's just a piece of it. Most of those agreements from a number-portability standpoint only includes call forwarding. They do not include the true database solution. So they fall far short of what's required under the act and what we're asking for.

And yet they have an interconnection agreement that would apparently allow them to go to customers tomorrow.

To do some interim things, right. [But] it's not a concern because we're working with those very same CAPs on interconnection agreements ourselves. So we would use those existing facilities where it made sense.

How will your rates compare to the RBOC local rates?

That's to be determined. But I think we'll offer parity rates. There will be cases where they may be more; there will be cases where they probably will be less.

So corporate customers shouldn't expect competition to necessarily lead to lower rates.

I think there's a possibility that prices could fall, but research shows business customers are interested in ease of use, convenience, single point of contact, single bill, single interface into billing centers, and all those kinds of things.

So if you look at adding that functionality, it's hard then to say, 'And in addition, you're going to see major, major price declines.' ■

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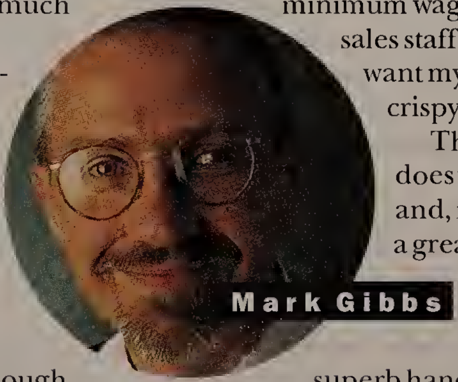
Lead me to the office, take me to the pilot, I am but a gadget fan

I have a bump on my head. I sat down to pen this missive around midnight and . . . "chirp," a cricket in my office. I thought I'd ignore it. "Chirrpp." I still ignored it. "CHIRRRRPPPPP" (The darn thing started to capitalize its noises).

"Alright already!" It had to go. Could it have settled on my desk or behind the door? No, of course not. The wretched bug was under my desk behind the mess of cables and power adapters.

Those of you wise in the way of insects will not be surprised when I admit that I totally failed. The bump on my head was the result of a lunge that missed the bug but connected my cranium with the dusty underside of the file server (I know spring cleaning is in order).

At this point, I gave up the pursuit. What I need is a gadget — a device for catching crickets. Is it too much to expect that technology might produce such a gadget?



Now, I am a big fan of gadgets, which leads me to this week's topic: specialized devices. I have always wanted a device that acted as a real electronic personal assistant and was small and light enough to be truly portable.

I thought that the Newton might be such a device. A price tag of $750 seemed a little much, but I reached into my pocket anyway. I worked really hard to make the Newton work for me — ask my clients and colleagues. At numerous meeting and trade shows I found myself fending off derisive remarks, such as "nice paperweight."

Alas, it was not to be; the Newton didn't work because it is simply too heavy, too slow, has a lousy screen, poor handwriting recognition and the only pocket I could imagine it fitting comfortably in is Shaquille O'Neal's. Thus, despite my best efforts to live with a Newton, it has sat on the shelf for the past eight months doing one task very well: being a paperweight.

Then I heard about the Pilot from U.S. Robotics. It sounded good. I tried to get my hands on one for an early review but no luck. (U.S. Robotics, please note: This column would have appeared ages ago if I could have gotten my hands on a Pilot unit.)

I have always wanted a device that acted as a real electronic personal assistant and was small and light enough to be truly portable.

After doing some research, I finally bought one a couple of weeks ago at CompUSA. I swear CompUSA is staffed by anti-salesmen. People more indifferent, less informed and less interested in customer service would be hard to find outside of a government department. I guess that's what you get when you pay minimum wage. (I always expect the sales staff to slip up and ask if I want my order regular or crispy, but I digress.)

The Pilot is terrific! It does what it is meant to do and, for a tad over $300, it is a great value.

Like the Newton, the Pilot doesn't have a keyboard, but it has superb handwriting recognition, thanks to the Graffiti system (you can learn how to use this with a few hours of practice), and its notepad, scheduler, to-do list and phone book are pretty good.

Better still, it does all this and weighs in at only 5.7 ounces, its batteries last for weeks and it easily fits into a pocket.

Add to that good Windows and Macintosh data interchange software invoked by touching one button and you have a really impressive, well-priced, well-conceived system that does what it claims to do with good performance to boot.

If this is the kind of gadget that appeals to you, don't hesitate: It gets a Gibbs Kool Gadget award (that is, if someone from U.S. Robotics could let me know where to send the award).

Now, if they could just come up with a cricket removal device, I'd be really happy.

Let Gibbs know if you've got a Pilot or problems with insects at mgibbs@gibbs.com or call him at (800) 622-1108, Ext. 504.

Jargon overload? Ease the pain with a funky guide

Networking is a profession that sprouts new language faster than a field of Georgia kudzu. Mastering the buzzwords is a key to success. Yet despite our best intentions, we often end up dog-paddling in a sea of vaguely familiar acronyms and jargon.

Bluffing is a common solution. Some network managers maintain the appearance of control with handy access to a specialized dictionary. Trouble is, many define jargon with jargon. Not much help.

Mitchell Shnier's new *Dictionary of PC Hardware and Data Communications Terms* (O'Reilly & Associates, Inc.) avoids typical technobabble. That's because Shnier wrote it as a crib sheet for himself.

"I never intended to write a book," Shnier said. "I began by writing down expansions of acronyms. Then I started recording juicy factoids and descriptions. Then things sort of got out of control."

A few of the 900+ definitions could use some meat. The complete definition of *Baby Bell,* for instance, is: "An RBOC. See IXC, LEC and RBOC."

The dictionary manages to weave in funky humor, making this a more enjoyable read than, say Webster's.

Such cryptic notations, however, are rare. Most definitions retain a folksy, down-to-earth flavor, such as Shnier's explanation of Adobe's *Acrobat* software: "A method of exchanging documents so that they still look nice."

The book contains plenty of technical detail. Yet the author manages to weave in funky humor, making this a more enjoyable read than, say, Webster's.

For instance, you probably knew that *bootstrap* means to start a computer: "Like pulling yourself up off the ground by your own *bootstraps* (those are the straps on the top sides of the boots that help you pull them on)."

Some entries give readers career-oriented pronunciation help. For instance, Shnier says? *SQL,* or Structured Query Language, should be called "'sequel' (not 's, q, l') if you want any respect from programmers."

Ever wonder where the term *flame* originated? "It is like blasting someone as an angry fire-breathing dragon might. (Of course, I've never actually seen a dragon toasting someone, but I don't expect it would be a pretty sight.)"

Shnier is generous with opinions. A *mainframe,* for instance, is "staffed by 24-hour-per-day operators reading the local tabloid-sized daily newspaper."

As for *legacy system,* it's "a traditional (usually IBM) mainframe. This term is usually used by the TCP/IP and Unix community as a polite reference to big, old dinosaur IBM environments."

Not that Shnier reserves his bias for IBM. Consider "FUD. Fear, Uncertainty and Doubt. A marketing tactic (which many used to accuse IBM of using) to discourage buying from the competition. See IBM and Microsoft."

The *Microsoft* definition says it all: "What can be said? Microsoft is big [and] hires enthusiastic programmers who work around the clock."

Some items are downright educational. Shnier's discussion of *Winchester* explains that IBM's disk drive was named after the famous Winchester 30-30 repeating, lever-action rifle.

Apparently the drive's two 30M-byte sides reminded someone of the gun. OK.

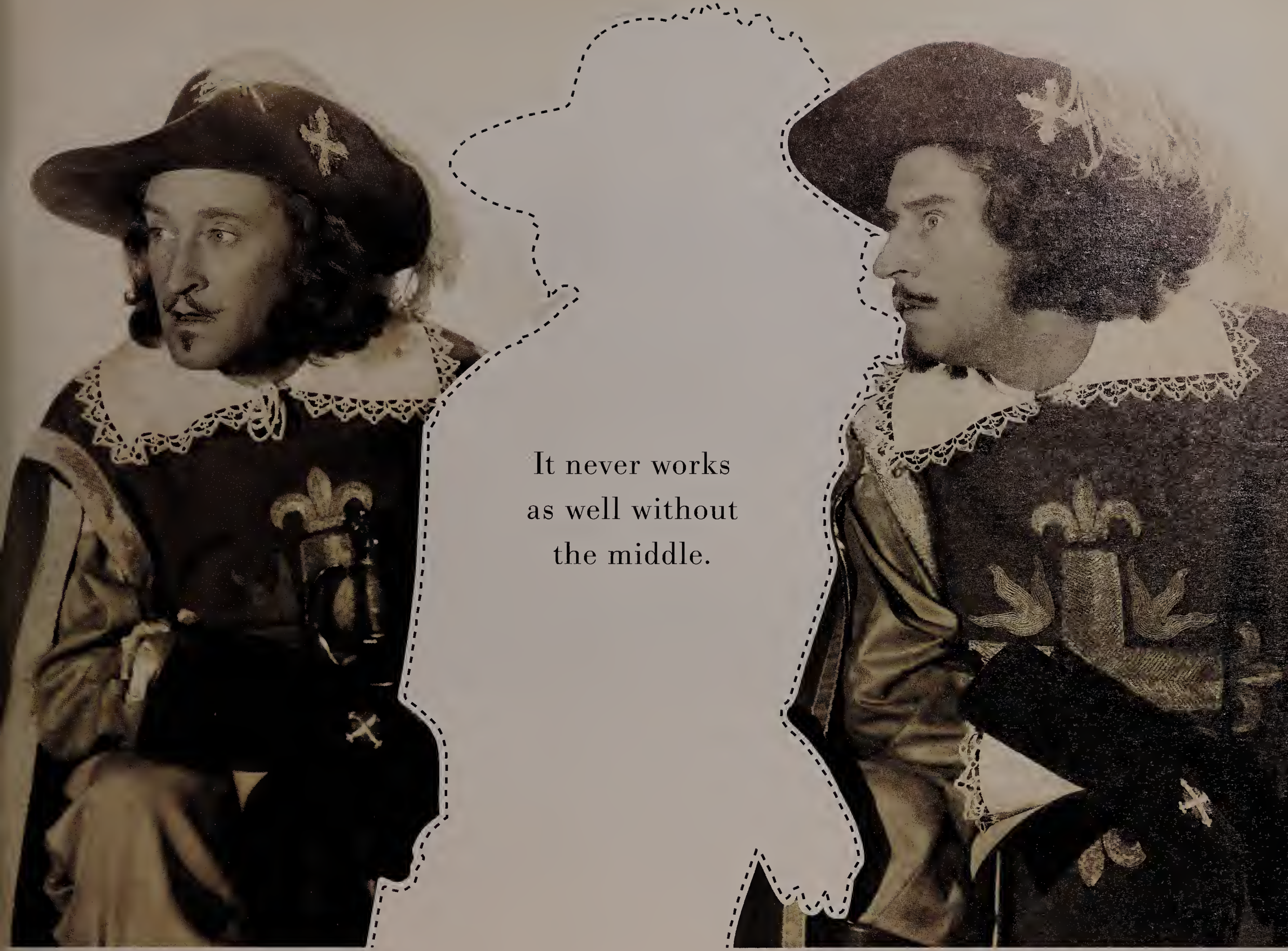
And did you ever wonder about *foo.bar* According to Shnier, it means "F----- Up Beyond All Recognition." But he tells us that "during the Second World War, the term 'fubar' was used in status reports and on repair tags to indicate [likely unrepairable] defective machinery and equipment. See NFG and RTFM."

And as for *RTFM:* "Read the F------ Manual. Commonly expressed by technical support personnel (almost inaudibly) when the information that a user seeks is already in the manual."

After a philosophical discussion about the virtues of reading manuals, Shnier concludes, "Then again, who would need consultants if everyone read (or had the time to read) the manual?"

Shnier should know; he's a datacomm consultant.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.



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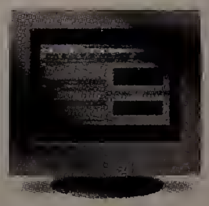

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